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THE INTER-RELATIONSHIPS OF THE BIOLOGICAL SCIENCES

By Melville H. Hatch

An address given at the initiation meeting of the Psi Chapter of Phi Sigma, February 27, 1947.

At a recent conference between our chapter president and your speaker, it was suggested that this year's initiates into our organization hear a discussion of the inter-relationships of the biological sciences. This seemed appropriate both because each of the initiates is specializing in one or another of these sciences and because the Phi Sigma Society itself is dedicated to the biological sciences as a whole.

The first question I would like to raise is this: are the biological sciences a unit rather than an artificial assemblage of unrelated subject matters? If we answer in the affirmative today, let us reflect that such assurance is little more than a hundred years old. In the mid-eighteenth century Linnaeus recognized three realms of nature: the mineral, the plant, and the animal. And as late as 1830 one of the world's great zoologists, the Frenchman Cuvier, was demonstrating conclusively the folly of the natural philosophers in attempting to find a uniform plan of structure that ran throughout the animal kingdom.

But for all their poor morphology, it was the natural philosophers that won the day. The announcement of the cell theory (1838) within a decade of Cuvier's death provided the uniform plan of structure pervading not the animal kingdom alone, but the plant kingdom as well. Our progressive understanding of the cell's protoplasmic contents has supplemented structural with functional unity. And Darwin's natural selection provided the key to the origin of the myriad of diverse forms of living things.

We can, accordingly, proclaim the biological sciences—biology—as a truly unified field of knowledge. The domain of biology is that extraordinarily improbable state of aggregation of matter—the living cell. It is a state so unlikely that it is well within the range of possibility that it arose on our planet but once and that all the different types of living things have derived from this one origination.

Having reaffirmed the unity of the biological sciences, I now propose to enquire into the principles involved in their subdivision and, as indicated in the title of my address, into the interrelationships of their several parts. There are, as I view it, three possible principles of subdivision: subdivision according to method, subdivision according to purpose (i.e., pure or applied), and subdivision according to subject matter. By way of anticipation, I shall attempt to show that the last of these three: subdivision according to subject matter, is the only adequate method of the three.

As an example of subdivision according to method, we have, for instance, a Department of Microbiology. Yet there is scarcely a laboratory in any of the biological departments that is not provided with equipment for microscopic observation. The use of the microscope is almost as widespread as is biology itself, and the Department of Microbiology is such only by a very special restriction of the term. No one, I believe, will affirm the contrary.

In the same category is the matter of experimentation.* There is a strong tendency in many quarters at the present time to equate the experimental method with science. If by this means it is believed possible to eject the social sciences from the pale of legitimacy, the fully accepted sciences of astronomy and geology are excluded likewise!

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* In connection with my remarks on experimentation, I must remind my hearers that I am not an experimental biologist and that, in consequence, my reasoning is subject to either of two types of fallacy. Either I will deemphasize the importance of experimentation through too great an interest in the techniques which I employ, or I will lean over backwards and compensate for my non-use of experimentation by over-emphasizing it! Let the hearer beware!

The nature of the relationship between experimental and non-experimental science goes, in fact, to the heart of our present topic, and is one in which the student of biological methodology may make a unique contribution to the general study of the scientific method. Each of the other sciences is so exclusively one or the other, experimental or observational, that their practitioners have little opportunity to experience the interaction of the two methods. Physics and chemistry and their derivatives are almost exclusively experimental. Geology and astronomy and social science and their derivatives are preponderantly observational.

In the hands of Aristotle, Linnaeus, Darwin, and their coworkers and followers, classical biology developed. The questions primarily in the minds of its practitioners were: What are the different kinds of living things? What is their structure? How have they arisen, both embryologically and phylogenetically? What are their ecological interrelationships? A vast complex descriptive science arose as a result of efforts to answer these questions, and the theory of evolution and the animal origin of man is its chief theoretical contribution.

As the event turned out, an experimental approach to the study of living things was not to come until Lavoisier established the science of chemistry in the latter part of the eighteenth century. Not until the famous Frenchman's experimental analysis of the nature of material transformations were men in the frame of mind or possessed of the technique to experiment with plants and animals. As the nineteenth century wore its course, experimental biology came into being. Agriculture and medicine were the practical beneficiaries. From trial-and-error rule-of-thumb crafts they became mighty applied sciences.

There was this, however, that was novel about the outcome. In physics and chemistry the experimental method had tackled the classical problems, the nature of motion, of heat, of fire, and had produced brilliant and satisfying analyses. The result was that the experimental science displaced the classical one. In biology, contrarywise, the new methods raised virtually new problems, so that, instead of displacing the classical biology, experimental biology was superimposed on it. We know a good deal more about morphology, embryology, taxonomy, ecology, speciation, etc., than Darwin did, but our increase in understanding is due about as much to the deepening and extension of the observational techniques which Darwin and his contemporaries used as to the application of experimentation. Biological experimentation has been important chiefly in the elucidation of the small-scale short-time process taking place in living things. The long-time processes of evolution and ecological adjustment still have to be investigated largely by the older methods.

The upshot of the matter is that biologists must employ nearly the full range of the scientific method in carrying on their investigations. At the bottom is the almost completely static classification of phenomena in terms of similarities and dissimilarities. The telephone directory and dictionary are scientific works at this level. The preliminary stages of plant and animal classification is often at this level, as, for example, Linnaeus' classification of the invertebrates other than the arthropods. Much current classification of genera and particularly of species is likely to be of this same sort, in which the groups are merely separated without the differentiations being correlated with distributional, phylogenetic or genetic factors. Uncorrelated morphological factors or even uncorrelated experimentally determined physiological factors may in the large view be at this same level.

The second level of scientific activity is hypothesis formation. As a result of reflection on one or a series of observations, the significance of the concomitance of two or more elements in the observation or observations is suggested, which is to say, an hypothesis is proposed. The consistency of this concomitance is then tested by reference to a further series of observations, which may cause the original hypothesis to be rejected, confirmed, or modified. The modified hypothesis is subjected to the test of further observation, and so on in potentially never ending series.

The highest level at which the scientist operates is that of experimentation, which is in reality just an extremely effective and powerful method of making observations. In modern discussions of scientific method experimentation is limited to observations involving a manipulation of factors in the environment of the experiment other than parts of the observers own organism. An experiment is performed, moreover, in connection with an actual or an implied "control," a similar situation in which the given manipulation is not effected. Under these conditions, any difference that develops between experiment and control is attributed to the manipulation involved. By repeating experiments, especially in the light of varied manipulations, a very exact relationship between cause and effect can be established and the causal relationships in extremely complex situations are revealed in a way that is very unlikely where direct inspection alone is employed.

The experimental method is subject to certain limitations, however, the operation of which account for the fact that biology neither is nor, probably, can ever become as completely experimental as certain other sciences. This is basically because experimentation is applicable to the investigation primarily of relatively simple systems and situations which are within both the spatial and temporal range of the investigator. A very slow process like evolution is largely outside of the investigator's time range and the earlier stages of the process as well as extinct types of life in general, like trilobites and dinosaurs, are definitely beyond his time range. Whales, for another example, are beyond experimental investigation because of their large size and for other obvious reasons.

Finally, systems may be outside the scope of experimental analysis because of their complexity. Such, in important measure, are the protoplasmic and psychological systems as well as those presented by developing embryos. Momentous progress has been made in analyzing aspects of these systems, but we still lack an anywhere nearly complete physico-chemical analysis of their nature. Small rapidly operating systems of this type are, however, exactly of the sort where the experimental method has achieved its most striking results in the past and where it may be expected to give important results in the future. The production of life in the test-tube is definitely not outside the range of possibilities of experimental biology. One practical upshot is obvious. If you are interested in experimentation go into physiology, psychology, or experimental embryology. Do not go into taxonomy, paleontology, or comparative anatomy!

It is in the matter of applied science and particularly applied biology that the significance and power of the experimental method is further revealed. As long as a science remains on the observational level it is not likely to prove of any very great practical importance. There are exceptions, of which I suppose that the discovery of the length of the year is as good as any. This is closely related to biology, since it made it possible to set a precise day for the spring planting of the crops. However, in general, casual relationships in nature are so obscure that only the power of the experimental method is sufficient to reveal them.

In medicine, for instance, Hippocrates discovered prognosis, Vesalius developed anatomy, and Leeuwenhoek discovered microorganisms. But it was not until after the development of chemistry and the application of experimentation that an effective medical science arose.

Similarly in entomology, the mid-nineteenth century saw a highly developed descriptive entomology in existence. Many of the injurious species had been recognized and their life histories worked out in detail. But whitewash and kerosene were as potent remedial measures as were available. It waited upon the development of an experimental applied entomology before insects really began to be effectively controlled.

But in applied biology, just as in biology as a whole, the experimentally obtained knowledge was superimposed upon the classical knowledge rather than substituted for it. Anatomy remains an integral part of pre-medical and medical education, and the largest staff of insect taxonomists anywhere in the country is that maintained by the Bureau of Entomology and Plant Quarantine in Washington, D. C. This is because innumerable basic morphological entities must be recognized in all sorts of biological work and recognized almost entirely by exclusively non-experimental methods before the experimenter and/or controller has a basis on which to start.

If this is more fully recognized in applied biology than elsewhere, it is probably because of the greater urgency of the issues at stake. Let us call to mind, however, that the students of *Drosophila* genetics reached a point where an intense taxonomic survey became a necessity. If and when experimental biology expands to the point where it works on other than just a few species, equally exhaustive studies will be necessary—even from the restricted view-point of the experimenters—on plants and animals as a whole.

The biologist, I insist, is interested in the study of living systems of all sorts, past or present, and must employ such diversity of methods in their study as the nature of the systems and his relation to them may require. Trilobites and dinosaurs must be included as well as fruit-flies and humans, and each must be studied by methods appropriate to it.

* * *

In the preceding section the effort has been made to show that the biological sciences cannot be classified according to the methods involved in their investigation. I now wish to enquire whether they may not be classified according to their purpose into pure and applied. Such a dichotomy is a pervasive one. University departments, schools, and colleges are organized along these lines: the Schools of Fisheries, Dentistry and Medicine, and the College of Forestry are examples at the University of Washington. When the matter is examined closely, however, the same relationship between pure and applied biology is found to prevail as we have already discovered between observational and descriptive biology. Investigations conducted with purely practical ends in view are dependent on purely theoretical studies. This is so much the case that both governmental and private agencies whose over-all aims are purely practical promote considerable amounts of scientific work that is without immediately practicable objectives.

Moreover, the approach of the applied biologists is according to a particular biological system. I am sure that no one would consider establishing a College of Applied Biology, with Forestry, Fisheries, Medicine, and Dentistry as subdivisions of the same. The classification here is in accordance with certain ecological systems. Fisheries studies the life of fresh and salt waters in relation to their production of animal food for man. Forestry is concerned with terrestrial conditions as they are involved in the production of trees of value to man. Medicine is concerned with the ecological relationships of the human body in so far as they are involved in the maintenance of health.

Another aspect of the situation is the contention of some of the British Marxists that there is no valid distinction between pure and applied science, that all science is ready to serve human needs and that the "pure" sciences do this as well as the "applied," only a bit more indirectly. If it has no other value, such an argument but further serves to stress the inter-relationships of all types of scientific work. The other issues raised are not pertinent to the present discussion.

My remarks so far have concerned themselves with some of the ways in which the biological sciences do not appear to be able to be classified. I would not have spent so much time in mere preliminary rebuttal if I did not believe that principles of positive importance were at the same time emerging from the discussion. While we are seeing why techniques and objectives are not valid bases from which to approach the classification of the biological sciences, we are simultaneously coming to understand some of the actual interrelationships involved.

We have been suggesting that the proper subject matter of science is the study of systems of various sorts. I now want to shift the point of view and point out that every science involves interrelationships between a human being (a scientist) and some sort of a situation. Further, I suggest that each of the different sciences may be placed in one of two categories. First, there are those sciences that are always involved in every conceivable situation in which a human being may be placed. Second, there are those sciences not so involved. The first group of sciences, those that effect a *vertical* division of experience, is of considerable interest. There is astronomy, for example: every human situation involves an astronomical situation, a definite location in some part of the astronomical universe. There is geology: every human situation involves a geological situation in relation to some portion of the earth. There are physics and chemistry: every human situation involves energy and matter and their transformations. There is biology: every human situation involves an organism! And so on through the social sciences. Every human situation has its psychological, cultural, ethnological, sociological, economic, historical, and political aspects. These vertical divisions—and we will examine their biological sub-divisions in just a minute—are the great lines of cleavage, the varying points of view from which every human experience may be examined.

It will be recognized at once, however, that the situations in which humans find themselves are not completely described by reference to these universal points of view. Were such the case, each human situation would be the same as every other one, and such is not the case. We live in a world of individualized systems, and it is from the point of view of these that we get the *horizontal* divisions of science: the astronomy of the Adromeda nebula, the geology of Marie Byrd Land, the biology of the trilobites or dinosaurs, the social science of World War II. These are not aspects of every possible human experience but only of those individuals who are properly oriented.

Before continuing the generalized analysis further, let us apply it to the biological sciences in particular. Which of the biological sciences represent vertical divisions, i.e., which apply in every human situation? Which, on the other hand, represent horizontal divisions, i.e., which apply in some situations and not in others? The decision in most cases will not be difficult. Morphology, taxonomy, phylogeny, evolution, physiology, endocrinology, embryology, genetics, cytology, histology, medicine—these and similar ones will be readily admitted to apply in every human situation. But this does not exhaust the list. Bacteriology and botany I nominate as equally universal, as referring to groups or organisms that are involved in every situation. Every human situation involves bacteria and photosynthesis, without which animal life is impossible. On the other hand, the botany of the higher plants or of the fungi, and the zoology of the insects or of the non-human vertebrates are at least border line cases. A human situation is conceivable in which they are not involved, but it is unlikely.

The horizontal divisions of our science are equally easy to recognize. The biology of sufficiently restricted groups of organisms or the ecology of restricted habitats like alpine meadows, the intertidal zone, or the depths of the sea are examples.

In other words, the vertical divisions of science concern themselves with those principles that apply to every situation that the scientist investigates. These principles do not constitute separate discrete watertight compartments. There is no chemistry apart from physics, there is no biology apart from both chemistry and physics. There is no natural science apart from social science. There is no "anything" apart from everything else. At the highest level it means that experience is integrated. At an intermediate level it means that we cannot teach biology without taking into consideration physics, chemistry, psychology, history, philosophy . . . , at the lowest level it means that I cannot study the taxonomy of beetles without consideration for their physiology, ecology, economic importance . . .

We have then, on the one hand those principles or aspects or point of view from which every situation and every system may be reviewed. On the other hand we have the individual situations and systems themselves in which the different principles manifest themselves. Obviously the individual systems and their study usually come first in the historical development because generalizations tend to arise out of the examination of individual instances. Again, the principles — the universal viewpoints — are important because they enable us to understand vast series of individual cases. They reach their full fruition not as they remain discrete abstract principles, however, but as they help in the more complete understanding of individual instances. Thus the course of interrelationships is through the particular to the general back to the particular again. This is seen especially in applied science, where the problem is always: What general principles apply in this particular instance and how shall they be applied? This principle is equally important in pure science, not only because individual instances and systems must constantly be examined in the testing and retesting of generalizations, but likewise, I maintain, because science of all sorts realizes itself finally only in the *elucidation* of the particular. *

* * *

Another aspect of this matter of interrelationship is involved in the current interest in border-line fields such as biophysics. Several comments are in order.

Such a development is simply additional emphasis on the principle we have been insisting upon, namely that all experience constitutes a single integrated whole. Within the natural sciences themselves, this has become almost a truism, though there are still many who cavil at introducing social science and ethics into the same circle —but this raises problems other than those I am discussing here.

Moreover, the special power of border-line investigation is noteworthy. I suggest we seek the analogy of a military campaign. At first isolated sectors are attacked and slow progress is made. Eventually it becomes desirable to proceed against the intermediate areas, and spectacular gains are frequently achieved with relatively little effort—gains which would have been impossible unless the isolated sectors had been won over first. An attack in an intermediate sector may well push further than the attacks on either side.

Border-line investigations then, are desirable not only because of the importance of keeping up investigations along the entire frontier of knowledge but because of the extra power that frequently results from the interplay of the principles and points of view originally derived in separate sciences. This not only may result in the development of a new science like biochemistry but the new principles so derived will react on the older fields of investigation. Darwin's *Origin of Species* brought together biological fields that had previously stood in more or less unrelated isolation. Morphology, embryology, taxonomy, ecology, zoogeography, paleontology, and the study of plants and animals under domestication were seen to be involved in unsuspected interrelationships. The idea of evolution, in its turn, reacted powerfully on each of the subject matters that originally went into it, as well as stimulated developments in other fields. In biology, biometry and genetics eventually came into being. Outside biology the effects were too numerous to mention and do not belong within the scope of the present discussion.

To summarize, then, we have suggested:

(1) That biology is a single unified field.

(2) That it must be divided not in accordance with the methods or motives employed in its investigation but in accordance with the biological systems being investigated.

(3) The biological systems may be studied in accordance with the principles common to all such systems—the vertical method of approach, or in accordance with the biological system to which the horizontal approach applies.

There remains the problem: In accordance with what principles are biological systems to be selected for study? Biological systems are immeasurably numerous beyond the time and energy of biologists to investigate: ten thousand species of animals alone in the state of Washington, a million or so at present described from the world with an indeterminable number more undescribed. Moreover modern work on such organisms as man, the rat, the guinea-pig, the *Drosophila melanogaster*, the horse, the cow, etc., show the many life times that could be spent on each species. Most drastic principles of selection must be employed. What shall they be?

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* I take another footnote to remind you that this conclusion must be evaluated in the light of my own interest in individual beetles!

I suggest that three factors are involved, the interplay of which determines the result: (1) the interest of the investigator; (2) the practical importance of the science; (3) the principles of the science. These three factors interact complexly and no one has priority. Historically, however, sciences have begun as a result of either the first factor or the second, since the principles of a science obviously cannot be determined until attention has been directed to the science itself as a result of random interest or practical need. In the maintenance of scientific activity, all three factors must continually be kept in balance in a sort of dynamic equilibrium if the science is to develop in a healthy fashion.

The random interest of investigators must be maintained because this is, so to speak, the reproductive mechanism of scientific activity, the area in which new ideas are born, tried out, accepted or rejected. It is probably the particular function of the University to support this type of investigation. Yet such activity cannot go too far. Science would stultify itself if it forever ran off after the new without ever following out the old.

Practical importance must be maintained likewise. Man's increased control over nature, his health and comfort, his release from prolonged toil in the production of his food, clothing and shelter, are certainly a prime motive for scientific activity. That human society which is not properly active in these matters will be eliminated by natural selection in competition with its fellow societies. Yet science cannot be given over entirely to such work. If it were, rote repetition and rule of thumb procedures would eventually come to dominate and the decadence of science would be at hand.

Finally, a continuous search for an interest in principles must be maintained. Only by such is the ground kept fertile for the development of new applications. Only by such will new observations fall into line with the old. Only by such will science aid in an understanding of man and his world and his destiny in it. Yet even this highest branch of science cannot preempt the entire picture, else we terminate in the philosopher's arm chair spinning endless theories *ad futilitatem*.

For the individual biologist there is, in addition to the above, another important factor. I call it feasibility. Given his personal situation, what is it practicable to do? Library, specimens, equipment, methods, and, if the individual is a professional biologist, the likelihood that the work will gain the proper recognition and advance him professionally—all these enter into the decision.

In these ways the individual selects and/or is led to select from the myriad of biological systems a few aspects of a few of them for study.

Any science will serve to exemplify this concluding analysis. I select my own. The interest is in searching out the beetles, studying their myriad forms, organizing them into a collection. The theoretical component is the task of surveying the different types of living things on the earth, classifying them, seeking to discover the processes by which they have become as they are. The practical element is that of providing descriptive continuity for the ecologist, the geneticist, the economic entomologist, and the agriculturist.

▽

THE FILING OF REPRINTS ACCORDING TO DATE OF PUBLICATION

By M. W. Boesel
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Many articles have been published on the filing of reprints. Workers seem to use three principal methods of filing: (a) by author, (b) by accession number, and (c) by subject. Each of these methods has rather serious objections. If one files by author, there is the problem of continually inserting papers throughout the file, of having papers of all ages mixed together, and of handling papers with multiple authorship. If one files by accession number, the first and third problems cited above are solved but there is no logical sequence of papers in the file inasmuch as papers are not necessarily procured as they are published. Filing by subject is the least precise method and is quite certain to result in ultimate confusion, principally because not all papers readily lend themselves to classification by subject. The writer, after several false starts, has come to use a fourth method which he has never seen mentioned in the literature but which has proved to be distinctly satisfactory. On several occasions the method has been described to fellow workers, some of whom have shown evident interest. It is presented here in the hope that it may find usefulness elsewhere. Perhaps some other workers are using substantially the same method.

The method referred to employs date of publication (year only) as a primary basis for filing. The method has many advantages. In the first place, nearly all additions are made at the end of the file but when an occasional older paper is acquired, that paper takes its appropriate place with other publications of its time. Thus all recent literature is kept together. Multiple authorship creates no problem under this plan, nor does the filing of single serial publications in cases where several or all contained papers relate to the subjects in which the collector is interested.

It is desirable to keep a card index, with the cards arranged primarily according to author, secondarily according to date or title. On each card the date of publication is entered at the upper right and serves to locate the position of the reprint in the file. Reprints are kept in letter files. If a year is represented by many reprints, these may be subdivided into groups: a, b, c, etc. In that case the letters are appended to the dates on the index cards. In no instance then is it necessary to look over more than a few papers to find the one desired.

An objection that will inevitably be raised to this method of filing by date is that there is no provision for segregation of subject matter. The method of course is most appropriate for a research collection covering a limited field of interest. But the objection noted above may be overcome in large part by keeping a notebook of subjects in which the author may be particularly interested. As papers are received they may be entered under these subjects. Usually merely the author and date will suffice; very compact and usable bibliographies result. Every time reprints are assembled from the file for a research project it is desirable to make out a bibliography under the subject in the notebook unless a complete bibliography is to be published.

The principal advantage of the whole method is its obvious simplicity.

It was in making education not only common to all, but in some sense compulsory on all, that the destiny of the free republics of America was practically settled.—*James Russell Lowell.*

You and I may never see it, but ultimately nothing is so certain as the triumph of the things of the spirit over the gross material forces of American civilization.—*Bliss Perry.*

BIOLOGICAL NEWS AND NOTES

Beta Chapter of Phi Sigma at Michigan University sponsored an exhibition of bird and animal paintings by university artists at the Rockham Galleries. The display included wild life pictures by George Miksch Sutton, of Mexican and other foreign animals and birds by three former service men. Several bird pictures by Louis Agassiz Fuertes were also exhibited.

The article by Dr. Efren del Pozo on "Pharmacological Studies of Some Plants Used in Aztec Medicine" which appeared in the May 1946 BIOLOGIST was reprinted both in Spanish as well as English in the December 1946 "Boletin Indigenista," a Mexican publication devoted to Indian affairs throughout the entire American hemisphere.

Ward's Natural Science Establishment puts out a most interesting bulletin. It is something more than a mere catalog of available items. There are a number of interesting short articles, practically all zoological. Anyone interested should write the Ward's Natural Science Establishment, Rochester, New York.

The January 1948 "Ray" of the sixteen chapters of Gamma Sigma Epsilon, Chemical Fraternity, carries two short papers — "Hydrogenation Problems" by Elizabeth Nash and "The Photographic Emulsion" by Harold A. Schulley.

"Mendelian" is a publication which undergraduate members might well find interesting. It has been published since 1923 by the Mendelian Club, the Mendel Biological Society and Beta Alpha of Tri Beta at Spring Hill College, Spring Hill, Alabama.

The work of Dr. John B. Youmans of Vanderbilt University Medical School, Beta 1923, and Dr. Carl V. Moore of Washington University School of Medicine, Iota 1930, was among those cited in a Saturday Evening Post article by Steven M. Spencer entitled "New Hope for the Anemic." At the American Association for the Advancement of Science meetings in Chicago last Christmas the article by associate editor Spencer was awarded the first AAAS—George Westinghouse Science Writing Award.

At the Botanical Society of America's annual dinner during the Chicago AAAS Meetings the retiring President's refreshingly original address was given by Dr. Neil E. Stevens, Professor of Plant Pathology at the University of Illinois. The title of Dr. Stevens' address was "Botanical Papers I Might Have Written." During the course of the speech he had the waiters pass out copies of "Factors in Botanical Publication and Other Essays," Volume 11, No. 3 of "Chronica Botanica." The collection will repay careful reading. ("Chronica Botanica" should be in any college library.)

Another handy publication is "Carolina Tips" from the Carolina Biological Supply Company at Elon College, North Carolina. The last few issues have carried a series of "Exercises in Protozoology" which might be helpful to those interested. There are also a number of shorter articles which also do not seem to be trying to make you want to buy something.

The name of Dr. Paul B. Sears of Oberlin College, Alpha 1916, has been placed in nomination for election as Director of the U. S. Chamber of Commerce to represent Natural Resources. This recalls Dr. Sears' famous work "Deserts on the March," still a classic on conservation.

The Douglas Lake Biological Station of the University of Michigan has issued a very attractive prospectus for the coming summer session. Of the staff of sixteen officials and instructors we notice at least seven who have been active in Phi Sigma. Instructional courses and research are offered in both botany and zoology. In the former group one notes that instruction is offered in plant systematics, aquatic flowering plants, plant anatomy, plant ecology, bryophytes, lower fungi and advanced bryophytes. In the animal group there are courses in ornithology, icthyology, entomology, helminthology, limnology, invertebrates, herpetology, and protozoology. There are courses for advanced students in ornithology, and limnological methods. Those interested should contact the Director, Dr. Alfred Henry Stockard, Assistant Professor of Zoology, University of Michigan, Ann Arbor. For University of Michigan students Beta Chapter maintains a scholarship at the summer station.

"The Wasmann Collector" published jointly by the University of San Francisco and Loyola University of Los Angeles is a quarterly journal for short biological papers. On its staff are noted Edward L. Kessel, Mu '28, as managing editor and John Thomas Howell, Mu '24, as one of the associate editors. The current issue carries three short papers, all zoological.

On the Program of the American Phytopathological Society meetings in the Stevens Hotel, Chicago, December 28-30, the names of the following older members of Phi Sigma appeared: K. F. Baker, Alpha Theta '30; W. M. Banfield, Zeta '27; J. T. Barrett, Mu '28; J. G. Dickson, Delta '17; Hurley Fellow, Zeta '20; Alex Granovsky, Zeta '23; A. B. Groves, Theta '28; H. N. Hansen, Mu '24; Wilbert A. Jenkins, Tau '27; R. H. Larson, Zeta '30; E. S. McDonough, Theta '30; W. F. Morofsky, Theta '28; Ray Nelson, Theta '22; D. H. Palmiter, Zeta '29; A. G. Plakidas, Mu '23; G. B. Ramsay, Delta '17; E. L. Reeves, Mu '28; A. J. Riker, Zeta '21; W. C. Snyder, Mu '28; J. C. Walker, Zeta '17; P. A. Young, Chi '27; W. J. Zaumeyer, Zeta '25.

The Duquesne University Science Staff puts out an interesting quarterly publication for science teachers: "The Science Counselor" under the editorship of Dr. Hugh C. Muldoon. The March issue carried articles by Louis Bromfield, Harold L. Madison, Otto Struve, Richard M. Sutton, Laurence Whitcomb, George W. Hunter, Victoria Corey, Robert J. Zoller, E. D. Merrill, H. M. C. Luykx and George Antonoff. That is a big league team in any sport. The prospective contributors of future articles are no less exciting. This quarterly has gone ahead by leaps and bounds in recent years.

"The Farm Quarterly" published at 22 East 12th Street, Cincinnati, Ohio, is a lush sort of shiny paper farm magazine for up and coming farmers who do not depend on "The Farmers Almanac" for their agricultural information. The March issue carried one article that should help to spread a worthwhile development. It is "Fish on the Farm" by Earl Franklin Kennamer and tells the story of the Alabama experiments with the use of 6-8-4 fertilizer to keep down microscopic plant life and promote microscopic algae as fish food. The article is well handled and beautifully illustrated.

The March issue of "The Hexagon," monthly organ of the forty-six chapters of Alpha Chi Sigma, Professional Chemical Fraternity, is a 64-page newsy publication with a few professional articles and a humor section that for years gone by has rejoiced this Editor's heart. From this month's "Hot Retorts" we present:

"Small College Joke"

"It seems that a certain small college, with budgets always bent in the middle and frayed about the edges, almost fell over dead when a rich widow offered the institution a million dollars if it would confer a degree upon her favorite horse. Now a horse is only a horse, but a million bucks is also a million bucks. So the trustees agreed. On commencement day, the horse was led onto the platform with the rest of the graduates and the president made a little speech. He then took the hood and started to put it over the horse's head. As he did so, he turned to the audience and said, 'You know, for me this is a new experience. It is the first time I have ever conferred a degree on a whole horse.' "

"—H.H.R. in 'I Heard It Somewhere.' "

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THE INNER FORUM

EDITORIAL POLICY REVISION

Some of the Chapters have been wondering why they are not receiving the traditional quarterly issues of THE BIOLOGIST this year. Some wrote to various Council members. Two or three wrote to the editor.

Here is the plain reason why there have been no issues: — With the exception of the Hatch article, there was *nothing* to put in them. The editor waited all Fall. Nothing happened. Rather than go through the customary formality of issuing a few periodical pages of submoronic tripe, the editor embarked on a widespread campaign. Personal correspondence was initiated with the twenty-five former active Phi Sigmans who have attained the distinction of being starred in "American Men of Science" as among the 1000 scientific leaders of the United States.

To each of these twenty-five leaders was submitted in a personal letter much the same problem as was submitted by the editor to the convention delegates in Boston a year ago. The eleven replies received are recorded in this issue for your information. Please remember that these men were received into Phi Sigma Chapter while they were still undergrad or graduate students. They were not drafted as Honorary members. They came in as students and worked their way up to the eminent positions they now hold. Their opinions merit consideration. Theirs is a "bug's eye" view of our Society.

Following receipt of answers from eleven of these gentlemen, the editor took up the same matter in another swarm of personal letters, this time to all the Chapter Council representatives whose addresses were available at the time.

Replies from eleven Council Representatives are recorded here as received.

LETTER TO STARRED PHI SIGMA MEMBERS

2 December 1947

My dear Doctor ....:

As one of the 26 members of Phi Sigma who "came up the hard way" to the eminence of being starred in *American Men of Science*, you are in a position to give me some sound advice.

During my 41 months enforced "vacation" overseas there developed a new perspective on much of my prewar activities, including the editing of *The Biologist.*

Now that the editorial position has been returned to me I feel that this is the time to make radical changes from the old interchapter news to a more purely scientific periodical devoted to the publication of beginning research.

This idea raises interesting problems. On the assumption that standard editorial procedures regarding proofreading, reprints, abstracting for *Biological Abtsracts*, etc., are adopted, what would be your reaction and possible solution to these problems:

I. Is a Change Desirable?

1. Is there a place in scientific journalism for a periodical publishing beginning, incidental or "side line" research?
2. If so, should publication be as wide in scientific range as Phi Sigma is in membership requirements, or restricted to the purely Biological (i.e. Botany & Zoology) fields?
3. Should papers accepted be restricted to short (i.e. not more than 2 pages of print and/or illustrations) articles?

II. How to Implement This Change?

1. Will you recommend papers to *The Biologist* for publication?
2. Will you check an occasional MSS from outside sources in your field as to its suitability for publication?
3. Will you write an occasional signed review of an outstanding book in your field? (We to furnish and you to keep the book.)
4. Would you accept membership on an Editor's Advisory Committee?

The reviving of moribund chapters in the U.S.A., the rise of new chapters not only in the U.S.A. but also in Mexico and possibly the Philippines, indicate a capacity for survival in Phi Sigma that is, to say the least, encouraging. This seems to be the time to give the society and its periodical some new aims to shoot at. Will you help?

Sincerely yours,

Anselm M. Keefe, Ph.D., Editor.

THE 25 STARRED SCIENTISTS

Dr. James E. Ackert, Kansas State College, Manhattan, Kansas; Nematology, Xi 1926.

Dr. George S. Avery, Jr., Brooklyn Botanic Garden, N. Y.; Plant Physiology, Z 1926.

Dr. Lester G. Barth, Columbia University, New York, New York; Embryology, B 1927.

Dr. George W. Beadle, California Institute of Technology, Pasadena; Comparative Genetics, Xi 1925.

Dr. Harold W. Beams, State University of Iowa, Iowa City, Iowa; Cytology, Zoology, Z 1927.

Dr. Alan A. Boyden, Rutgers University, New Brunswick, New Jersey; Serology & Ontology, Z 1920.

Dr. Charles H. Danforth, Stanford University, California; Experimental Morphology, I 1921.

Dr. Conrad A. Elvehjem, 741 Oneida Place, Madison, Wisconsin; Physiology, Biochemistry, Z 1929.

Dr. Alfred E. Emerson, University of Chicago, Chicago, Illinois; Animal Ecology, AE 1929.

Dr. Max W. Gardner, University of California, Berkeley, California; Plant Pathology, Z 1917.

Dr. Frederick L. Hisaw, Harvard University, Cambridge, Massachusetts; Endocrinology, Z 1924.

Dr. Leigh Hoadley, 25 De Wolfe Street, Cambridge, Massachusetts; Embryology, B 1919.

Dr. Carl L. Hubbs, University of California, Berkeley, Calif.; Ichthyology, B 1929.

Dr. Hubert S. Jackson, University of Toronto, Toronto, Ontario; Mycology, Z 1926.

Dr. Harold Kirby, University of California, Berkeley, California; Protozoology, M 1922.

Dr. Carl D. La Rue, University of Michigan, Ann Arbor, Michigan; Plant Hormones, B 1920.

Dr. Thurlow C. Nelson, 77 Adelaide Avenue, New Brunswick, New Jersey; Mollusks, Limnology, Z 1917.

Dr. A. J. Riker, University of Wisconsin, Madison, Wisconsin; Plant Pathology, Z 1921.

Dr. Frank H. H. Roberts, Smithsonian Institution, Washington, D. C.; Archaeology, E 1923.

Dr. Francis O. Schmitt, Massachusetts Institute of Technology, Cambridge, Mass.; Nerve Biochemistry, I 1924.

Dr. Paul B. Sears, Oberlin College, Oberlin, Ohio; Plant Ecology, A 1916.

Dr. Robert C. Tryon, 1196 Keith Avenue, Berkeley, California; Animal Behavior, M 1925.

Dr. John Paul Visscher, Western Reserve University, Cleveland, Ohio; Protozoology, I 1921.

Dr. James Waddell, 84 Clive Street, Metuchen, New Jersey; Biochemistry, Vitamins, Z 1924.

Dr. Philip A. White, Rockefeller Institution, Princton, New Jersey; Plant Physiology, L 1921.

STARRED SCIENTISTS SPEAK

Dr. James E. Ackert, Xi 1926, Department of Zoology, Kansas State College

Manhattan, Kansas

"Your letter of November 26th has just come. The circumstances of my election to Phi Sigma Society were such that I have not been located where there is a Chapter. I would be glad if you would send me one or two of the recent issues of *The Biologist*.

"I believe that there is room for another scientific journal such as you described. It is almost certain that the country is going to put more stress upon scientific training and this will produce more research."

Dr. George S. Avery, Jr., Zeta 1926, Director, Brooklyn Botanic Garden

Brooklyn, New York

"In answer to your letter of November 26 about *The Biologist:* first of all, I think it is fine that you are willing to undertake the editorial job again. Concerning the several points:

I—1. Yes.

2. It seems to me that the judgment of the Editor should determine this — to be based chiefly on things that he feels of general interest and more or less significant.

3. Yes.

II—1. Probably not. This would not be lack of desire to cooperate but chiefly because papers of the sort that would be of interest are not apt to cross my path. Things that come from research here at the Garden would be kept for strictly professional journals, or for our own popular-interest botanical periodical PLANTS & GARDENS.

2. Yes.

3. No. I am sorry to say that for reasons of health I am

4. forced to cut down on jobs rather than take on new ones."

Dr. G. W. Beadle, Xi 1925, California Institute of Technology

Pasadena, California

"I am interested in your plans for "The Biologist" and shall be glad to do what I can to help implement them. Because of already having too many assignments for my time, however, I prefer not to accept membership on the Advisory Committee.

"I shall be glad to recommend papers for The Biologist if suitable manuscripts come to my attention and I shall be glad to do an occasional book review in the field of genetics or in closely related fields."

Dr. Max W. Gardner, Zeta 1917, College of Agriculture, University of California

Berkeley, California

"Your letter raises some interesting questions about The Biologist of which my last issue is dated 1943 and is emaciated in comparison with the vigorous issues of 1935 to 1938. I am indeed glad to know that you are going to revive the journal and guide its development. As to your questions:

I. I think a change is desirable, whereby more space is devoted to reports of research, and less to chapter news.

1. Yes. 2. Logic would dictate same latitude in subject matter for publication as is applicable to membership. 3. Try first with less restriction as to length, especially since occasional longer general articles, not necessarily containing new research results, may be wisely accepted.

II. 1. Yes. 2. Yes. 3. Yes, or try to get some colleague to do it. 4. Yes.

"I like the idea of publishing short, condensed reports of research by younger workers. I think sale of separates should be promoted."

Dr. Frederick L. Hisaw, Zeta 1924, Harvard University

Cambridge, Massachusetts

"It was good to hear from you after so many years. Harvard does not have a chapter of Phi Sigma consequently my contacts have been reduced to a minimum since I came here. I can readily see that a publication program such as the one you suggest would serve a purpose in the institutions that have active chapters. I think it would be the most useful to the young beginner who could be given an opportunity to publish an interesting but small piece of investigation that might not be acceptable to some of the larger professional journals. Then occasionally eminent gentlemen give important addresses before Society chapters. These people could be invited to prepare a paper of some length. Therefore I would suggest both short and moderately long articles when good judgment may dictate.

"I am so far away from the beaten path in my present position that it would be rather difficult for me to keep the "feel" of the Society well enough in hand to take a very active part. I would be willing to help in any way that is possible by looking over manuscripts after a definite policy has been established. I rather think that the Editors Advisory Committee would be more satisfactory if the members were made up of individuals from places having active chapters."

Dr. Carl L. Hubbs, Beta 1929, Oceanographic Institute, University of California

La Jolla, California

"1. There could be a place for such a periodical as you indicate. There would be an advantage of course in publishing some of the beginning research. The work of course should be screened pretty carefully, because one would not want our oncoming biologists getting in the habit of publishing half-baked material. Many of our graduate students, however, do very creditable pieces of investigation more or less aside from their thesis or in following up some side line that would not appear well as an appendix to the published thesis. Such material could very well go into "The Biologist" as you envision it. You might also include occasional talks given by senior scientists at your meetings.

2. I should think you would rather need to make the field of the Journal agree with that of Phi Sigma.

3. It would be well to adopt a general policy of having the papers short, and with moderate illustration, but I have always been opposed to too rigid rules along such lines. The editor should have considerable discretion. To adopt too rigid rules sometimes destroys the value of the journal, or limits its reputation.

"Answering your questions further, with reference to the implementation of the change:

1. I would be glad to recommend material for "The Biologist."

2. I do so much reviewing of manuscripts for publication in various journals that I imagine an occasional additional one would not be too much of a burden.

3. I am already serving as Review Editor of The American Naturalist, but do at times prepare reviews for other publications. I would not wish to accept any considerable assignment along this line, but on rather rare occasions I probably would be able to give you a review.

4. I am already on five or six editorial boards, and think this is more than my share. So I would rather prefer that you seek your advisory committee elsewhere.

Dr. A. J. Riker, Zeta 1921, College of Agriculture, University of Wisconsin

Madison, Wisconsin

"Being chairman of the Library Committee in our College of Agriculture, I have been reviewing the list of journals carrying research papers. Even the list of journals in our library covers many pages—so many that it is confusing. I am forced to the opinion that biology would be better off if there were fewer journals and that those we have were better supported. On the other hand, there is already so much confusion that a few more would not make it any worse.

"As I see it there is a very real value which *The Biologist* can aid; namely, in keeping the different chapters posted about one another and in containing various and important inspirational addresses given at some times, particularly at the annual meeting.

"However, I think there is a real question how far *The Biologist* should go toward publishing accounts of research beyond listing the problems that different members of Phi Sigma are working on and references to detailed reports in the technical journals.

"I do not wish my comments to be discouraging to you and others if you feel like going ahead. I am writing as frankly as this only because you asked for my opinion."

Dr. Frank H. H. Roberts, Jr., Epsilon 1923, Associate Chief, Bureau of American Ethnology

Washington, D. C.

"I believe there is a place among scientific journals for a periodical devoted to the work of beginners and also to incidental or "side line" research. Most of the regularly established and better known journals are so crowded that it is almost impossible for articles or items of that nature to be published in them. I am verv much in favor of giving encouragement to beginners and of making possible an outlet for some of their work.

"Before making a decision regarding the policy to be followed, that is, with reference to restricting the papers to the purely Biological fields, I think it would be well to make a careful check of the membership and determine what the proportion of representation is. If, as I suspect, some of the fields are represented by a very small number of members, the printing of articles relating to their particular interest probably would not appeal to most of the Society. Perhaps a proportional publication of articles might be the answer. There are some fields, of course, which do have a general appeal irrespective of the specific interest of the reader. For example, certain anthropological papers, although even in this field some of the work is so specialized that it has no great interest to workers in other branches of anthropology. On the whole, my feeling would be that it would be advisable to draw the majority of the articles from the fields which have the greatest representation in the Society. I realize that the problem is difficult and my suggestion may not be particularly helpful.

"I believe, under the existing conditions of excessive printing costs, it would be well to restrict the length of papers as much as possible so that more could be printed in each issue. However, I would not be in favor of a hard and fast rule in the matter, and think that the editor should be given some discretion. An occasional paper of greater length which actually constitutes a distinct contribution might well be published.

"Not being in close contact with the academic field, I do not as a rule have opportunity to know just what the younger people are doing in the matter of writing articles or preparing manuscripts. Occasionally I do hear about an article which some graduate student has prepared and under such circumstances, if it is decided to publish more than botany and zoology, I would be pleased to recommend them for publication. On the other hand, I may say that I would be willing to check an occasional manuscript and make recommendations about it to the editor. I also would be willing to do an occasional review of a book in my particular field. All of this, of course, would not be a very great help because anthropology in general and archeology in particular are such a minor interest in Phi Sigma.

"Perhaps I should have stated in the beginning that I agree with you in your idea that "The Biologist" should be made a more purely scientific periodical, with less space given to campus "chit chat." I felt for a long time that the section on chapter news was not much of a contribution both because the chapter secretaries appeared to take it so lightly and because the information contained in the chapter was of so little interest to those outside."

Dr. Francis O. Schmitt, Iota 1924, Department of Biology, Massachusetts Institute of Technology
Cambridge, Massachusetts

"It has been so many years since I have seen a copy of "The Biologist" or heard anything of the affairs of the Phi Sigma Society that I find it difficult to answer the questions raised in your letter of December 1.

"I have serious doubts of the value of a journal for junior research or "side line" research. Research is either good or it is not good. If it is not good, it should not be published anywhere. Quite possibly it would be useful to publish very short abstracts of work being done by graduate students. Book reviews might be appreciated though these are readily available in journals like "Quarterly Review of Biology," "The American Scientist" and others.

"I have been impressed with "The Scalpel" as a publication of an honorary premedical fraternity. This publication features articles on the training of premedical students and other subjects of genuine interest to this class of students. Similar problems confront the neophyte in professional biology and I don't doubt there would be plenty of material for publication."

Dr. Paul B. Sears, Alpha 1916, Department of Botany, Oberlin College
Oberlin, Ohio

"In general I would say yes to the three questions under No. I, although I surmise that the various state academies offer publication to the kind of articles you have in mind.

"With respect to No. II, I shall be glad to help in any way I can although a formal appointment to an advisory committee would add one more activity to the large number already unattended to. I should prefer to have any assistance I give off the record, for the sake of my conscience at least."

Dr. J. Paul Visscher, Iota 1921, Biological Laboratory, Western Reserve University
Cleveland, Ohio

"I was very intrigued with your letter of December second and would agree very definitely that a change is desirable, and I do believe there is a place in scientific journalism, with the idea in mind, which you indicate. I certainly believe that these should be short and brief, and illustrated wherever possible. In order to implement this change, I shall be glad to do what I can to recommend papers for your publication and will gladly review an occasional manuscript. I will also review an outstanding book, as you suggest, and see no reason why I should not accept membership on your committee."

THE RE-EDUCATION OF TEACHERS

What is needed is a re-education of our teachers. Unless teachers can present values with facts, no amount of isolated study in value subjects will suffice to give meaning to disparate facts in various fields. In the broadest sense, all teachers instruct in the humanities, for what meaning has any subject matter until it is related to human problems? When teachers realize they are teaching men to be free, not teaching them to be physicians, lawyers or businessmen as the primary objective, we can look for the meaningless character of contemporary education to give way to a more coherent pattern. Until teachers become educators of the whole man, and not primarily chemists, sociologists or psychologists, we cannot hope that students will be introduced to the basic ideas and ideals of the race—which are meaningless until they become the priceless personal possessions of the individual.—*James A. Pait, Emory University, in The American Scholar.*

LETTER TO COUNCIL REPRESENTATIVES

17 January 1948

My dear friend:

I am addressing this letter to you personally because on my return from overseas I was asked to resume the editing of the Phi Sigma *Biologist*, and I promised to do so *on condition* that I had a free hand in rebuilding it. At the Boston meeting last year, the convention of the chapters concurred on this program. I desire your advice as a Council Representative.

I have just had a sampling of the opinions of a group of former Phi Sigma *undergrads* who have risen to the distinction of being starred in "American Men of Science." Here are the questions I asked them, and the way they reacted to the main thesis which I proposed as follows: "On the assumption that standard editorial procedures regarding proofreading, reprints, abstracting for *Biological Abstracts*, etc., are adopted, what would be your reaction and possible solution to these problems as follows:

I. Is a Change Desirable?

1. Is there a place in scientific journalism for a periodical publishing beginning, incidental, or "side line" research?
   Yes: 91% No: 9%
2. If so, should publication be as wide in scientific range as Phi Sigma is in membership requirements, or restricted to the purely Biological (i.e. Botany & Zoology) fields?
   Yes: 88% No: 12%
3. Should papers accepted be restricted to short (i.e. not more than 2 pages of print and/or illustrations) articles?
   Yes: 88% No: 12%

II. How to Implement This Change?

1. Will you recommend papers to the *Biologist* for publication?
   Yes: 75% No: 25%
2. Will you check an occasional MSS from outside sources in your field as to its suitability for publication?
   Yes: 75% No: 25%
3. Will you write an occasional signed review of an outstanding book in your field? (We to furnish and you to keep the book.)
   Yes: 50% No: 38%
   Undecided: 12%
4. Would you accept membership on an Editor's Advisory Committee?
   Yes: 25% No: 75%

As a sampling only this is not discouraging. No one could blame a busy scientist for being unwilling to participate in something which he approves, especially if he is frank enough to state that he is already overburdened and doesn't want to promise what he isn't sure he will be able to produce. So now I am asking you what you think of the foregoing propositions. Before you make your decision, will you permit me to give you my personal opinion?

In 1931 I took over the editing of the *Biologist*, and held it up until May 1940 when I knew I was to be called into active duty in the Wisconsin National Guard before the year was out. During my five and a half year's military service most of it with a medical unit in the South Seas, I had plenty of chance to review some of my past performances in and out of educational fields. It gradually dawned on me that perhaps one of the things I could have done better would be on the editing of the *Biologist*. In accordance with the feeling of the chapters at that time I had helped to make it too much of a strong fraternity journal and not enough of a scientific publication. That did not prevent eight chapters from becoming inactive. As I have since come to see it, what the *Biologist* is, is what people will think of Phi Sigma. If they don't think too much of Phi Sigma, there is only one place to put the blame.

It is not often a man gets a chance to make amends for his past "offenses and negligences." When the National Council of Phi Sigma moved its 1946 meeting to Washington (where I was winding up my active duty in the Pentagon) in order to ask me to resume the Editorship, I felt that this was more than a coincidence. It was a chance to put my purpose of amendment to work.

I have been going slow in getting this thing started. If too many of you disagree with the starred Phi Sigma scientists and feel I'm on the wrong track, I shall, of course, drop out of the picture and let the council choose someone else to carry on in the old fashion.

For myself, I am *not* satisfied with the prewar *Biologist.*

Sincerely yours,
ANSELM M. KEEFE, Ph.D.
Editor.

P.S. Please read over the inclosed tentative instruction sheet very carefully and feel free to make suggestions for desirable changes. If enough of you approve it, we could make it a "Standard Order of Procedure." Any scientific papers you or your graduate students may have ready for immediate publication would be then in order. A.M.K.

INSTRUCTION SHEET

Announcing a New Publication Policy

THE BIOLOGIST is a bimonthly periodical published under the patronage of the Phi Sigma Society, an organization devoted to the promotion of interest in biological research.

I. OBJECTIVE: THE BIOLOGIST desires to publish comparatively short contributions to the progress of the biological sciences, either as beginning research, progress reports or side line discoveries arising out of or tangential to completed or nearly completed research problems.

II. CONTRIBUTIONS: Articles submitted must represent some definite contribution to the biological field. Purely historical, biographical or historical articles will not be considered.

III. ADVISORY: The opinions of research specialists may be sought by the Editor as to the advisability of publishing any article submitted.

IV. LENGTH: Articles must be as short as consistent with adequate treatment of the research reported. Extensive recapitulation of previous work on the problem should be eliminated.

V. ABSTRACTS: A brief summary of each article to consist of not more than fifty words must be separately presented with original copy for forwarding to *Biological Abstracts* as soon as the date of publication is determined. Summaries will follow the format used in *Biological Abstracts.*

VI. ILLUSTRATIONS: Sharp photographs or clear line drawings *in ink*, NOT PENCIL, may be submitted. Lengths of articles should be curtailed in proportion to the extent of illustrations used. Cuts used will be paid for by the contributor at standard engraver's rates and become *his* property immediately after publication.

VII. PROOFREADING: One galley proof of all accepted articles will be submitted to contributors. Prompt return in envelopes provided is essential.

VIII. REPRINTS: Free reprints will not be furnished to contributors. They may be ordered, however, at the time the proofs are returned to the Editor, in accordance with the tariffs to be published on the inside rear cover of THE BIOLOGIST.

OPINIONS OF COUNCIL REPRESENTATIVES

William H. Behle, Council Representative, Alpha Lambda Chapter, University of Utah

Salt Lake City, Utah

"I am greatly interested in the publication and appreciate your willingness to take over and rebuild this important function of Phi Sigma Society. Before answering your questions I would like to say that you needn't have qualms about the prewar magazine. It was a good journal even though favoring the fraternity angle rather than the strictly scientific side. I always looked forward to it and was especially interested in the personal notes and Chapter News. Perhaps this is because I am interested in people and their doings. I hope that in the reorganization there can be a retention of a "Notes and News" department or even an abbreviated Chapter News section. This sort of material will, of course, have to be held down and will occupy a subordinate position in the newer scientific publication which is in the offing.

"Concerning your questionnaire submitted to the starred scientists, I would have answered "yes" to all the points, especially those in group I. We do need such a periodical where these beginning scientists can see their first efforts published. It is a tremendous incentive for continued work. With the editorial standards you desire the articles can be made worthwhile. Let us keep the journal for the graduate students rather than the well established scientist.

"I endorse your tentative instruction sheet except that I would not be so adamant in eliminating historical and biographical articles. Something might come along really worthwhile once in a while or you may want to run a series of biographical or historical articles some time. Undesirable material can always be rejected. I wonder if "comparatively short" contributions might not be clarified as in your questionnaire by making mention of two page length or something of the sort. Another suggestion is that since your instructions will come to the attention of many beginners and you have mentioned illustrations, could you add another paragraph giving essential rules for copy like double spaced typewritten pages, one side only, ample margins, 8½ x 11 paper of standard weight, etc."

Ludwig G. Browman, Council Representative

Lambda Chapter, University of Montana

Missoula, Montana

"It sounds definitely worth a try. I would like to see you go ahead with it."

A. J. Gillan, Council Representative, Alpha Omega Chapter, Marquette University

Milwaukee, Wisconsin

"A new publication policy for the "Biologist" receives my sincere endorsement. The policy as you have outlined it seems to be free of criticism, in general. With respect to the length of contributions for publication, it would seem to be advisable to depend upon the judgment of the Editor and his staff. A concise and elegant report of investigations is desirable, but many student investigators are inexperienced reporters. I feel that the young scientist should be encouraged to write up his findings and submit them for publication.

"The matter of chapter newsletters is not mentioned in the new publication policy. These letters are largely of little interest outside of the chapter, and certainly have no scientific value. Perhaps they have some morale value for their authors, but I would like to see them replaced by something more interesting to others. Perhaps a page of letters to the editor, or a problem clinic, or some similar subject could be substituted for the newsletters."

Rose Grandinetti, Council Representative

Alpha Kappa Chapter

New York City, New York

"I have discussed with several Alpha Kappa members the problem you presented in your letter of January 17 and feel strongly that your plan for rebuilding the *Biologist* is very wise. Though the *Biologist* furnished interesting reading, its range was rather limited.

"It is hoped by the members of the Alpha Kappa Chapter that the increased scope of our publication will result in a more active participation of the individual chapters."

Myrtle Greenfield, Council Representative
Alpha Nu Chapter, University of New Mexico
Albuquerque, New Mexico

"I am very much interested in your proposal to reactivate "The Biologist" and to attempt to give it real standing in the biologic field. It would seem to me that you have thought the proposition through very carefully and that you have come to good decisions. It is unfortunate that such a small percentage of the biologists to whom you sent the questionnaire seemed to find it possible to give you real assistance on the Editor's Advisory Committee. However, I believe they might reconsider when they find your efforts to be productive.

"In my opinion it will be necessary to consider carefully the quality of the contributions that you receive. It has been my observation that young scientists or frequently scientists reporting for the first time are prone to make reports without sufficient data to support their conclusions. I have noticed instances where they will report on results of as few as four or five animal inoculations, and I have heard papers discussed with all earnestness when the results were based upon as few as ten true observations. Much of that you as Editor could screen out even without an Advisory Committee, but if you had an Advisory Committee at your hand, this screening might be done with less irritation to the individual or institution reporting. I think any well substantiated piece of work that has original qualities is worthy of being printed, and "The Biologist" might be an instrument that would encourage many really worth while young people; but again the young persons should learn at an early age that no conclusion can be drawn unless well substantiated by adequate material."

Melville H. Hatch, Council Representative
Psi Chapter, University of Washington
Seattle, Washington

"I am somewhat luke-warm in the matter of attempting to transform the Biologist into a journal for the publication of original research papers.

"Biology is so vast a field that for any one journal, except it be one of the greatest eminence and prestige like Science or Nature, to accept original papers in the whole biological field, is to run the danger of burying them and bringing them out in such a way that they will not come to the attention of the proper specialists. Moreover, the rigid limitations of length which you suggest are of such a nature that only notes or preliminary abstracts or preliminary notices could be accepted.

"I think the practice of publishing the same information twice, first as an abstract or preliminary notice, is a bad one. There is enough scientific literature already without our having to have two or more titles for what is in reality a single contribution. If the Biologist must publish original papers, let it take papers of sufficient length to make them individually worth while. I, for instance, would not be anxious to publish taxonomic notices on new species or a revision in the Biologist when there are a dozen American biological journals available for such publications, and I should think the same would be true for other fields.

"On the other hand, if the Biologist could devote itself to a really superior collection of general non-research papers, including reviews (I am not thinking of book reviews but reviews of more or less limited fields), after the fashion of Sigma Xi's American Scientist or the Quarterly Review of Biology or some of the articles in the Scientific Monthly, I believe it can make a very real place for itself. Granted that all the past contributions to the Biologist have not always been of the greatest interest, still I do not believe that you have too many regrets in this matter.

"Admittedly, such materials as I envisage could not usually be contributed by active members of the chapters because effective general articles require a wealth of experience and a maturity of viewpoint that comes only with the passage of the years. On the other hand, such general articles should be much more interesting reading to the young biologist than the highly specialized research articles that your program seems to call for."

C. F. Jackson, Council Representative
Phi Chapter

Durham, New Hampshire

"I read your letter over carefully concerning the reorganization of the Biologist. Later decided and reread it several times before undertaking to answer your inquiry. Some of the questions I had in mind include the fact that at the present time there seem to be so many organizations, each with their own special publications, many articles appearing are evidently not the result of mature thought and judgment. The bibliography on any subject is now so extensive one must screen it through carefully in order to separate that which is valuable from that which is useless. These facts have all been considered, together with the fear that out of my appreciation for Phi Sigma (an organization which, I think, on the University of New Hampshire campus is doing more for the advancement of science than any other honorary society), I might be over-enthusiastic concerning the promotion of the Biologist. Frankly, I have not felt that the Biologist as formerly constituted has been of anything other than very local interest. With the foregoing in mind, I welcome an opportunity of commenting on the questions you submit:

I. Is a change desirable?
   1. Yes, I believe there is a place for such a journal.
   2. I do not see how you can avoid publishing a journal for Phi Sigma and not cover all the fields therein represented.
   3. Here I do not agree with the majority, feeling that articles may appear from time to time which should not be limited to 2 pages.

II. How to implement this change.
   1. Yes, I should be glad to recommend papers for publication in the Biologist.
   2. Yes, I should be willing to check manuscripts as to their suitability for publication.
   3. Yes, I should be willing to review books or articles referred to me.
   4. Yes, I should be willing to accept membership on the editorial advisory committee providing this committee was a functioning committee rather than a figurehead. In regard to the "New publications policy" I wholeheartedly agree with the 8 articles which constitute this policy.

"In conclusion I may say that I feel very strongly if the Biologist enters the scientific field it should be something more than a scientific publication in name. The articles appearing in it should represent real advancement in science."

Ronald L. McGregor, Council Representative
Kappa Chapter, University of Kansas
Lawrence, Kansas

"After reading over the material you sent me in regard to this matter and thinking about it, I find I agree with the policies you tentatively plan to adopt. In addition I have discussed the matter with certain members of the Botany and Zoology Depts. here and can report that they wholeheartedly agree to the change.

"I would like to suggest that you put out some sort of a guide to assist beginners and others in preparing manuscripts. I think this would be of much assistance to a lot of individuals. This could include a sample abstract, proper way to correct galley proof, etc.

"Again I will say I approve of your proposals and feel you are taking a definite step forward which will be of benefit to all members of the society."

Ray D. Owen, Former Council Representative
Zeta Chapter, University of Wisconsin
Madison, Wisconsin

"I have just received your letter of January 17, forwarded here from Madison. Since Cal Tech has no chapter of Phi Sigma, I feel that my association with that organization is now relatively remote, and I am doubtful that you will be much concerned with my opinions about the issues raised in your letter. However, since I have in the past given these matters some thought, I shall venture some opinions anyway.

"To begin with, I should say that I am quite sympathetic with your desire to improve the *Biologist*, and I believe that the free hand given you in rebuilding it should remain free. I am interested in the direction your experienced judgment has suggested for the "reconstruction," and would rather like to see how well and how extensively you can rebuild in that direction. If you succeed in establishing a journal of the sort you describe, I see at present no reason why I should not recommend short papers consistent with the tone of the journal, should they come to my attention and should the authors be eager to publish them. If you should wish me to do so—which seems unlikely—I would be willing to check an occasional *MS* for suitability. I would, if you wished, write an occasional signed book review in genetics, particularly immunogenetics. In view of my tenuous connection with Phi Sigma, and for other reasons that will shortly be apparent, I would not accept membership on an Editor's Advisory Committee, even if you should ask me —which, again, seems most unlikely.

"While I think you should be free to develop the *Biologist* as you see fit, and while I shall be interested in how you come out and wish you all success, I must admit that my own inclination, were I in your position, would probably have been different. I don't want to seem dogmatic in this, because I see arguments on both sides. But on the whole it seems to me that the volume and diversity of current biological journals is already so great that one should examine the functions of a new journal very carefully before encouraging its publication. From the standpoint of the science generally, I see little to be gained from adding to the confusion of its literature beginner's, or incidental, or "side line" research, unless the importance of the findings in any such particular study is sufficient to justify its publication in a regular, mature research journal. From the standpoint of graduate student members of Phi Sigma, at institutions where research is taken seriously, and of other research people, I am doubtful that the *New Biologist* will serve a very useful function; there are several other outlets for short, or preliminary, or incidental works; these other outlets have a wider distribution and a greater dignity than I fear might be granted the *New Biologist;* the effect I fear might be to leave only the dregs of such efforts to Phi Sigma's organ. For undergraduate members of Phi Sigma, especially at institutions where research is not emphasized, an effort to bring investigation into the foreground is, I think, laudable. I am, however, hesitant to accept the incidental or less-reliable fringes of research results as the best example in this direction; and I am somewhat doubtful that the too-easy acceptance for publication of the too-superficial efforts of beginners that might accompany the *New Biologist* would have, on the whole, a desirable effect on its undergraduate contributors or readers.

"An alternative you may have considered would be a small journal somewhat comparable to the sections "Marginalia" and "Scientists Book Shelf" in the *American Scientist*, that could review current solid developments in the wide field that Phi Sigma represents. There is no point in my elaborating this; you are much better able to judge the feasibility or desirability of such a development than I am.

"My reactions to the questions on your questionnaire would therefore be as follows: On I (1)—No. On the remainder, assuming that such a journal were established and functioning, you find me with the majority as you gave the vote, in each case. You will have noted that my "yes" on II (1) was qualified."

Ethel I. Sanborn, Council Representative

Alpha Mu Chapter, Oregon State College

Corvallis, Oregon

"I have read with interest your letter regarding Phi Sigma and the *Biologist*, with its instructive sheet several times.

"To me your suggestions are excellent. I would like very much to see the *Biologist* become a truly scientific publication, and believe under your editorship it may become such.

"In I, No. 2, where only Botany and Zoology listed, I feel Bacteriology and Entomology should be included. At the college here, those two biological sciences are strongly represented in Alpha Mu of Phi Sigma.

"I shall try to have one of our students, a Ph.D. candidate, send you a paper soon for publication in the *Biologist*."

Fred N. Zeiner, Council Representative
Epsilon Chapter, University of Denver
Denver, Colorado

"In reply to your communication of January 17 I find that I am in agreement with the proposed changes in the *Biologist*. It has been my feeling for some time that there is a need for a journal devoted to short, beginning research projects. Many worthwhile data have remained unpublished simply because they are not sufficiently extensive for publication in the usual highly technical journal. Probably most papers of this nature would fall within the two page limit; however, I feel that an arbitrary limit of three pages would be more desirable.

"As a publication of Phi Sigma it appears to me that the range of the *Biologist* must in fairness to the membership be as wide as that membership. Also, perhaps such a policy would help to integrate in the mind of the student the contributions from the various fields of biology.

"I shall be happy to recommend papers to the *Biologist* for publication. For the present I must answer in the negative concerning the checking of MSS and the writing of book reviews. I can only hope that in the future there will be time available to permit me to accept such duties."

INCREASE OF INTEREST IN TECHNICAL SUBJECTS

The central theme of higher education in our time is the conquest of nature for the comfort and convenience of man. To some a statement of that kind will seem entirely natural and proper. To others it can only appear deeply shocking. For the frank acceptance of such an analysis places engineering studies in the central stream of educational development and relegates many other subjects to the margins. But whether the trend is good or bad, the evidence for its existence is readily available to the thoughtful.

If one reads books on educational theory and objectives only, it would be easy to prove by quotations that higher education is not actually passing through any such revolution. The real evidence is to be found in other ways—in the published catalogues of our colleges and universities, with their increasing list of scientific and technical subjects, and in the quest of boards of trustees for presidents who have won their spurs as scientists, physicians, and engineers. It is to be found in the applications from students in foreign countries, the great majority of whom desire to come to America to learn the new techniques which played so large a part in World War II and which in any case will give to other countries new navies, as in Turkey; new industries, as in Brazil; or a new agriculture, as in China.

Or, consider the letters from young veterans who want to complete an interrupted education with the help of government funds. Almost without exception, these young men and women desire an education which will help them, as soon as possible, to make a living. Where imagination has been aroused, or intellectual curiosity sharpened, it is often with regard to the apparently unlimited present opportunities of applied science.

To try to turn the stream in any other direction probably would be unwise and certainly futile. An increasing number of our educated men will be devoted (either as scientists or as administrators of business and government enterprise) to a deeply felt, if only half-expressed, purpose, namely, to conquer nature for the increasing comfort, convenience, and power of man. If this be so, engineering is no longer a side show but the chief performer in the main tent.

Robert G. Caldwell, in *The Technology Review* (M.I.T.).

THE BIOLOGIST

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COUNCIL

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DIRECTORY

Of all Active Chapters

BETA—University of Michigan, Ann Arbor, Michigan, founded 3 June 1916.

EPSILON—University of Denver, Denver, Colorado, founded 5 March 1917.

ZETA—University of Wisconsin, Madison, Wisconsin, founded 30 May 1917.

ETA—University of Akron, Akron, Ohio, founded 20 April 1921.

KAPPA—University of Kansas, Lawrence, Kansas, founded 31 May 1921.

LAMBDA—Montana State University, Missoula, Montana, founded 4 May 1921.

MU—University of California, Berkeley, California, founded 27 April 1922.

NU—Washington and Jefferson College, Washington, Pennsylvania, founded 11 May 1922.

PI—Emory University, Georgia, founded 3 January 1925.

RHO—University of Illinois, Urbana, Illinois, founded 28 March 1925.

SIGMA—University of Florida, Gainesville, Florida, founded 4 December 1925.

UPSILON—Miami University, Oxford, Ohio, founded 7 May, 1926.

PHI—University of New Hampshire, Durham, New Hampshire, founded 21 May 1926.

CHI—Montana State College, Bozeman, Montana, founded 11 February 1927.

PSI—University of Washington, Seattle, Washington, founded 7 April 1928.

OMEGA—University of Oklahoma, Norman, Oklahoma, founded 24 March 1928.

ALPHA ALPHA—University of Southern California, Los Angeles, California, founded March 1928.

ALPHA BETA—Mount Union College, Alliance, Ohio, founded 17 May 1928.

ALPHA EPSILON—University of Pittsburgh, Pittsburgh, Pennsylvania, founded 23 March 1929.

ALPHA ETA—Oklahoma Agricultural and Mechanical College, Stillwater, Oklahoma, founded 13 March 1930.

ALPHA THETA—State College of Washington, Pullman, Washington, founded May, 1930.

ALPHA IOTA—Bucknell University, Lewisburg, Pennsylvania, founded 9 January 1932.

ALPHA KAPPA—Hunter College, New York City, founded 8 January 1932.

ALPHA LAMBDA—University of Utah, Salt Lake City, Utah, founded 13 February 1932.

ALPHA MU—University and State College of Oregon, Eugene-Portland-Corvallis, Oregon, founded 18 November 1933.

ALPHA NU—University of New Mexico, Albuquerque, New Mexico, founded 21 April 1935.

ALPHA XI—Rhode Island State College, Kingston, Rhode Island, founded 17 May 1935.

ALPHA OMICRON — Marquette University, Milwaukee, Wisconsin, founded 18 June 1938.

ALPHA PI—University of Colorado, Boulder, Colorado, founded 24 May 1941.

ALPHA RHO—University of Arkansas, Fayetteville, Arkansas, founded 23 May 1945.

ALPHA SIGMA—University of Texas, Austin, Texas, founded 2 February 1946.

ALPHA TAU—National University of Mexico, Mexico, D. F. founded 7 April 1947.

ALPHA UPSILON—University of California at Los Angeles, California, founded 17 May 1947.

ALPHA PHI—College of Puget Sound, Tacoma, Washington, founded 28 February 1948.

EDITORIALS

A JOVIAN HEADACHE

Minerva was the ancient Roman goddess of wisdom. According to Fraser's "Golden Bough" and other Mythologies, Jove had a splitting headache. He called one of the other Olympian deities to open his head with an axe. The god did so. Out of Jove's cloven head there sprang, fully armed, the goddess of wisdom, peace and industry.

Not every headache has so felicitous an outcome. Ideas seldom spring from human minds so complete and so perfect that they cannot be improved.

What is being suggested in the "Inner Forum" section of this BIOLOGIST must, therefore, not be construed or accepted as final iron-clad editorial policy. It is being presented here so that *all* concerned, the active members, the faculty members, the council representatives, the honorary members, and the council members, may all see for themselves the way along which the BIOLOGIST could be developed.

If too clamorous an outcry of opposition develops, it will be evidence that the present Editor is barking up the wrong tree and a new appointment will be in order. Those who oppose this project, therefore, should make their opposition known to the Council Members *before* they hold their meeting early this summer.

TANGENTIAL RESEARCH

Elsewhere in this issue reference is made to the types of research papers for which THE BIOLOGIST could be made a desirable outlet. Among these are enumerated "beginning" and "tangential" research.

No one will have difficulty in understanding the meaning of "beginning research." It embraces all those types of biological research problems which are given younger research workers to cut their scientific teeth on. This excludes, of course, doctoral dissertations at the upper end of the range, and at the other end, such items as term papers, historical compilations, journal club reports, etc.

The former are too imposing and should merit publication in this country or abroad in the great internationally known periodicals of the various scientific societies. The latter are too ephemeral to warrant putting into print.

In between these two there is a large field—a field which makes actual discoveries but hesitates to put them into form for the botanical, zoological, physiological, ecological or other journals. A few of these papers find their way into the "Technical Papers" or the "In the Laboratory" sections of the AAAS "Science." Most of them, however, are put aside for publication "sometime." And who among our older readers has not had the disconcerting experience of setting something aside "for later publication" only to discover that even before his written notes have yellowed and the dust is noticeably thick on them, someone else has come out with identical or closely parallel results?

As far as "tangential research" is concerned, it embraces all those sideline problems which crop up in any worthwhile investigation. Many of them are intriguing. Many of them are suggestive of entirely new problems. Some are solved in the research that answers the questions raised in the main problem. Yet they do not have enough bearing on it to warrant inclusion in the final publication, which itself is often cut to minimum length by the page and length requirements of the bigger scientific journals.

For these types of discoveries THE BIOLOGIST could offer a medium of expression for which there are not too many avenues available at the present time.

So long as the papers, short or of medium length, represent the result of real research or describe new research techniques, they should find a welcome in the pages of THE BIOLOGIST. Then the society's journal would have enough material to warrant quarterly or even bi-monthly publication as the available funds might dictate.

The Editor will be glad to receive such papers for the August issue.

"CEILING 1000"

As this, the single 1947-48 issue of THE BIOLOGIST goes to press things internationally do not look too encouraging. Clouds that may mean war are banking low overhead. In more senses of the word than one the clouds hang uncomfortably low over all the campuses of the world.

American college students who returned to their books after service in the war were definitely bent on having something to say in collegiate, national and world affairs. Last Fall they formed the National Students Association with headquarters at Madison, Wisconsin. Recognizing the common bonds that unite all students around the world, they put out feelers toward liaison with the International Students' Union which had its headquarters in Prague, Czechoslovakia. In February of this year, came the "anschluss" of Czechoslovakia to the Soviet vassal states, and the I.S.U. lost its internationality, becoming communist in fact as well as tendency.

The U. S. National Student Association's liaison officers in Europe tried to have the I.S.U. join or at least approve the students of Charles University of Prague in their repudiation of totalitarian practices there, where twenty faculty members were expelled and several students were injured. The I.S.U. demurred. The N.S.A. promptly and to its credit accepted the resignations of its foreign liaison officers and now faces at home the repudiation of all undemocratic procedures in international as well as interscholastic affairs.

Since all the active membership of Phi Sigma are students either at the graduate or undergraduate level, they cannot be indifferent to what is going on in the world about them. Whether it may ultimately mean getting into uniform again or not is something only the tides of chance and the circling days, months and years can tell.

Whatever may happen, this one thing is sure—true science, freedom of thought, expression and investigation can not exist where a superstate dictates. The liquidation of one nation's genetic research workers is still a matter of sober warning. It may be very fine to yearn for the day of the proletariat, but proletariats are no better than the ideology that drives or the power that rules them. We rank and file Americans feel that we prefer to elect our own leaders.

Whatever their faults they at least are our faults. If they have any virtues or any successes, we all take credit for the same virtues, the same successes, the same achievements.

If a scientific-minded people, with some decent respect for what science can offer the world and itself in the way of bettering the conditions of mankind, freely elects its own leaders, it has some reason to hope that its freedoms, all of them, and the freedom of unrestricted and undirected research will be maintained.

It took our Western civilization a long time to clamber painfully out of the darkness of ignorance and the mists of superstition. That is why we do not like the clouds that lie low over mankind today. Let us hope that they are lifted soon. Meanwhile, there is work to be done and not all of it is scientific research.

POST OBITA

LEON JACOB COLE

1877 - 1948

Dr. Leon J. Cole, fourth national president of Phi Sigma fell victim to the Grim Reaper on 17 February. He was professor of genetics at the University of Wisconsin at the time of his death. His record in *American Men of Science* is an impressive one. It is prefixed by a star indicating that he is one of the 1000 leaders in scientific fields in the country.

In 1927 Zeta Chapter elected Dr. Cole to honorary membership. Nominated to the national presidency of Phi Sigma by the Council at its Denver meeting on 1 September 1939, he was elected to the high office by the chapters, and took office for the first time when he presided at the Silver Jubilee Banquet in Columbus, Ohio, when the society celebrated the twenty-fifth anniversary of its founding. While on his way to the installation of Alpha Sigma Chapter at the University of Texas he and his wife stopped over at the University of Oklahoma as guests of the University President. While there he suffered a stroke from which he never quite recovered.

The sympathy of all Phi Sigma goes out to his family and to the University of Wisconsin. We are all the poorer for the loss of his kindly interest and understanding encouragement. We are richer in that we have known and been associated with him. That is something not even Death can take away.

CHARLES ATWOOD KOFOID
1865 - 1947

On 30 May 1947 Death ended the career of Dr. Charles A. Kofoid of the University of California. A native of Illinois, he studied successively at Oberlin, Harvard and the Naples Zoological Station, and taught at the Universities of Michigan, Illinois and California.

In 1922 Mu Chapter of Phi Sigma elected the professor of zoology to honorary membership in Phi Sigma.

His very effective obituary in the 14 November 1947 issue of SCIENCE was written by one of his fellow professors, Dr. Harold Kirby, another member of Phi Sigma who entered Mu Chapter as an active member the same year that Dr. Kofoid received honorary membership.

Dr. Kofoid was a scientific author of note, and editor or coeditor of several publications. More than that, he has given American education several generations of intellectual offspring in the research workers and the science teachers whose effectiveness and inspiration stems from the work of his life. They are his best memorials.

SOL FELTY LIGHT
1886 - 1947

Twenty-two years of service to the University of California Department of Zoology came to a tragic end on 21 June 1947 when Dr. S. F. Light was drowned. Born in Kansas, he was educated in Park College, Missouri and the Universities of the Philippines, Princeton and California. His father was a Presbyterian Missionary and as a result his son saw teaching service in Japan from 1908 to 1910, in the Philippines from 1910 to 1914. He was at Princeton from 1914 to 1915 and back to the Philippines from 1915 to 1920. He next went to Amoy, China and served there until 1924. In 1924 he returned to the United States, remaining at the University of California, first as a student of Dr. Kofoid, later as associate, lecturer, assistant, associate professor and full professor at that institution.

In 1925 he was elected to Mu Chapter of Phi Sigma while still a graduate student. His influence on his graduate students was as deep and lasting as that of his great professor.

ELMER HAUSER WIRTH
1895 - 1948

In the death of Dr. E. H. Wirth on 26 September 1947 the University of Illinois lost its Professor and Head of the Department of Pharmacognosy and Pharmacology in its professional schools. Dr. Wirth was a native Ohioan, studied at the University of Michigan and at Leiden on the Netherlands-American fellowship where he received his doctorate in 1931. He had taught at the University of Michigan and the Detroit Institute of Technology before he went abroad. His services with the University of Illinois began in 1922 and with the exception of his year at Leiden, lasted until his death.

In 1918 he was elected to membership in Beta Chapter of Phi Sigma.

LORANDE LOSS WOODRUFF
1879 - 1947

Another Phi Sigma honorary member was transferred to the eternal roster on 23 June 1947 when Dr. L. L. Woodruff, Yale University Professor of Protozology died in his New Haven home. Dr. Woodruff was a native New Yorker and received all of his professional education at Columbia University. He taught at Williams College and Yale University, where he became assistant professor in 1909, professor of zoology in 1915, and professor of protozoology in 1922—a post he held until the end. He first became associated with the Marine Biological Laboratory at Woods Hole in 1905, taught there in the summers until 1914, became a trustee in 1924, another position which ended only with his death. He was a member of many scientific societies and the author of many research papers.

On the occasion of the dedication of the new biological sciences building at the University of Oklahoma in 1938, Dr. Woodruff was the guest of the University. He was inducted into Phi Sigma as an Honorary Member by Omega Chapter on 25 March and delivered the Phi Sigma Lecture on "Paramecium, Past and Present." The next day he was the main speaker at the dedication ceremonies, speaking on "Philosophers in Little Things."

BOOK REVIEWS

MAMMALS OF NORTH AMERICA by VICTOR H. CAHALANE. The Macmillan Company, New York, N. Y. 1947. $7.50.

This book of 682 pages and many excellent drawings on the Mammals of North America is handsomely bound, has a pleasing format and is well-worth its cost for the illustrations alone.

The author of this book, now with the United States Fish and Wild Life Service, did his college work at Massachusetts College, Yale, and the University of Michigan.

He has served as field naturalist for the Roosevelt Wild Life Forestry Experiment Station; as instructor in the School of Forestry and Conservation at Michigan; as investigator for the State Department of Conservation of Michigan; as Director of the Cranbrook Institute of Science; as Wild Life Technician of the National Park Service and is now in charge of the National Parks Fish and Wild Life Service.

His interests are in the fields of Wild Life Surveys, Conservation, Life Histories of Mammals, and Mammalian distribution, particularly of the South Western United States.

In this book, the author divides our North American Mammals into nineteen general groups such as the chipmunks and squirrels, the wild dogs, the cats and so on. It would have been better, I believe, if such headings as "Chucks" and "Heliographer" had not been used. After all, why not say simply Wood Chucks and Antelope. Again, why not say bats rather than "the flyers." Such points, however, are minor criticisms and largely a matter of personal opinion.

There is an interesting introduction concerned with such subjects as the numbers of mammals formerly present in North America, their extermination and restoration, the relationship between mammals and man, what are mammals, their histories, and some ideas are briefly given concerning the classification of mammals. There is also included a very useful list of over one hundred general references as well as a good list of references for each of the major species considered in the text. On the jacket of the book appears a statement that the mammal portraits by Francis L. Jacques are dramatic. They definitely are. Further, these black and white pen drawings are in my opinion remarkably fine. If one never reads any part of the book, he should at least thumb through it to see these drawings.

For at least most of the mammal species considered, in addition to interesting general material, the author gives a paragraph concerning the general description of the species, another one concerned with distinguishing characteristics, and finally, at the end of each section, the range or distribution is given.

To give some idea of the extensiveness of this book, it may perhaps be worth-while to mention some of the nineteen categories of mammals considered. These are the Wild Pig or Peccary, six members of the deer family, the antelope, a group which he calls "original American livestock," included here are the Buffalo, Musk Ox, Big Horned Sheep, and the Mountain Goat.

The fifth group is concerned with the opossum and the armadillo. Next come the mole and shrew followed by the bats, the bears and the bear's small cousins the raccoon, the coati, and the ringtail. Still further along in the book, the skunks, badgers, and weasels are considered. The wild dogs, that is our foxes, the coyote and the wolf are in chapter 11. There are six kinds of cats given in chapter 12. Even the seals, sealions, sea elephants and the walrusses are discussed in still another chapter. Following this unusual group come the various rodents such as the woodchuck, marmot, the squirrels, the chipmunks, the pocket gopher, the various kinds of mice and rats native to our country not to mention the porcupine, the beaver, and the muskrat. In chapter 18, the rabbit, the hares, and the pika are considered at considerable length, and in the final two chapters the manatee, the whales, and the dolphin are described.

For at least all of our commoner forms of mammals, of which there are several interesting groups as witness the list just given, several pages of most interesting material are given.

All in all, this is a most worth-while and certainly interesting and informative book which might well be on the library shelves of anyone interested in our mammals. From any one of several standpoints, it is a book replete with accurate information, excellent and unusual illustrations and so written as to answer certainly most of the questions asked by individuals of diverse interests.

By Dr. A. I. Ortenburger
University of Oklahoma.

THE WORLD EXPANDS by Dr. George Howard Parker. Professor of Zoology Ementus, Harvard. Harvard University Press, Cambridge. 1946. $4.00.

"Recollections of a Zoologist" will give a nostalgic twinge to every "almost-old-timer" who looks back on his post-world-war-I years at the Marine Biological Laboratory in Woods Hole. How Dr. Parker's reminiscences will affect more or less ancient sons of Harvard is indeed a matter of pensive speculation. Dr. Parker has been connected with the Harvard scene since he entered as a freshman in 1883.

As one of the former group, this reviewer can testify how large Dr. Parker bulked on the M.B.L. horizon between 1921 and 1931, despite the fact that he then held no official position there. From many Harvard and Radcliff friends the reviewer sensed how the Cambridge schools felt the imprint of his personality in their zoological work.

Unquestionably Dr. Parker is what the "native" people of New England towns would term "a character." Curiously enough his "recollections" reveal that he is not a native New Englander. None, or at least a very few, of those who then came under the influence of his distinct and original personality knew much of his background. To them he was another one of the "Harvard crowd"—a somewhat unpredictable sort of person. It was at an "MBL Club" variety show held in the little town hall at the bridge over the Eel Pond Gut that he performed a feat not too easy for young men. He balanced a glass of water on his forehead while standing erect, then lowered himself to a prone position and finally resumed his erect posture without spilling a drop. The unpredictable part came when he dashed the water out over the applauding audience. On the other hand, there will be few of those present who will forget the beach party on Naushon Island when the W. J. V. D. Osterhouts announced their elder daughter Anna's engagement to "Teddy" Edison, son of the great inventor. The laboratory whaleboat was anchored in fairly deep water on the north side of the island. The party found its way across to the south or Vineyard "Sound" side. There was an abundance of good things to eat and a huge beach fire around which we huddled and sang as the wind borne fog drove down the sound and wrapped us in its clammy blanket. The presiding genius of the party was neither of the senior Osterhouts. It was "Uncle Howie." He it was who kept the fire up and the string of anecdotes blazing. He it was who at the end led the party back across Naushon through the bayberry bushes and the foggy blackout to the whaleboat, left high and dry by the receding tide. Under Uncle Howie's guidance we rocked it loose and slid it out to floating water. At his suggestion the men of the party made chairs with their hands and waded out with the women folk to the boat. The return trip rowing across rapidly swirling waters of "the Hole" in the ever thickening fog was not without its element of excitement, the water was filled with phosphorescent organisms and our oars dripped liquid fire. In it all, however, Uncle Howie was completely at home and in his charge the heavy boat was steered with unerring accuracy to the unseen M.B.L. dock. In those days it was easy to appreciate, but difficult to understand Dr. Parker. Now that his "Recollections" have appeared in print, it is much easier to do so.

With self-effacement that is characteristic of the man, Dr. Parker has suppressed all references to the research problems to which he devoted his main interests in life until the end of his book.

More could be said here about the author's relations with other scientists of Harvard University or with whom he came in contact during his travels. This would only destroy the interest of the prospective reader. It is sufficient perhaps that we indicate here what a challenging personality Dr. Howard Parker is and how very worth-while it will be for every biologist to get acquainted with him at least vicariously in a careful reading of his book.

For most individuals the world inevitably expands as life goes on. It is unfortunately not always true that some are capable of expanding to the fullest extent with it. Among those favored ones the scientific world will always rate Dr. George Howard Parker.

By ANSELM M. KEEFE, Editor.

THE AMERICAN INDIAN IN NORTH CAROLINA by DOUGLAS L. RIGHTS. Duke University Press, Durham, North Carolina. $5.00.

This attractive and well annotated piece of anthropological and historical work begins with the coming of DeSoto to North Carolinian shores in 1540 and brings the story of the main Indian tribes down to the present day. Anyone interested professionally or otherwise in the American Indian can ill afford to neglect this scholarly and interesting work.

THE AMERICAN ILLUSTRATED MEDICAL DICTIONARY by W. A. NEWMAN DORLAND. W. B. Saunders Co., Philadelphia and London. $8.50 with Thumb Index, $8.00 without.

Since the first appearance of this practical handbook of medical terminology back at the turn of the century, it has now gone through its twenty-first well merited edition. Revised in collaboration with Dr. E. C. L. Miller of the Medical College of Virginia, the 1600-page volume with 880 illustrations seems to have omitted little of the new terminology that has risen out of the war, including as it does military aviation and tropical medicine, as well as the results of modern mycrological and nucleonic research.

ACTIONS OF RADIATIONS ON LIVING CELLS by D. E. LEA. Macmillan Co., New York, Cambridge at the University Press. $4.75.

Supplied with many interesting photographs, a very complete 20-page bibliography, and both author and subject indices, this new work comes from a source which warrants it respectful consideration from those who are interested in the effects of radiation on viruses, genes and chromosomes. There is also an appendix containing supplementary calculations on such subjects as dosage in air, and energy dissipation in tissue, distribution of ionization in irradiated tissue, etc.

ANIMAL COLOUR CHANGES AND THEIR NEUROHUMOURS by GEORGE HOWARD PARKER. (Cambridge at the University Press). The Macmillan Company, 60 Fifth Avenue, N. Y., N. Y. 1948. $6.50.

Anyone who has studied the embryology and anatomy of the common New England squid *Loligo pealii* can hardly have failed to be entranced by the pulsating multicolored chromatophores of the very young animals. All the tales of salamanders and chameleons previously heard or read from then on cease to fascinate. Whatever chromatophore-bearing animal studied (and there are many more than run-of-mine biologists realize), the work of Dr. Parker comes as a new standard reference on the subject—a biological "must" for the library.

Whether by accident or design it is a happy coincidence that this summary of the main scientific achievement of Dr. George Howard Parker should appear almost simultaneously with his autobiography reviewed elsewhere in this issue. While the latter work gives us many-sided glimpses of the man Parker, this volume gives us the author's own definitive interpretation of his life's work on color changes and neurohumours.

There may be, and probably are, those whose interpretations of the meaning or method of animal color-changes differ from those of Dr. Parker. In the light of the extensive work from 1910 to 1943 described here they will find it difficult to have their interpretations accepted.

The facts presented are substantiated by a bibliography of more than 1200 citations, only 73 of which bear Dr. Parker's name as sole or senior author. As an historical documentation of all recent research on the subject worth recording this volume is invaluable.

While it may well be that Dr. Parker has pretty nearly exhausted the subject, it is to be hoped that a younger generation of his intellectual offspring will not refuse to use this work as a springboard for further research.

ATLAS OF OUTLINE DRAWINGS FOR VERTEBRATE ANATOMY by S. EDDY, C. P. OLIVER, J. P. TURNER. John Wiley & Sons, Inc., New York. $2.00.

This new spirally bound book with individually perforated detachable sheets covers the amphioxus, dogfish, sturgeon, garfish, bowfin, necturus and cat in more than 100 pages of illustrations. The original atlas of 1940 made many friends who will not be slow to welcome this more expansive work as an extremely well-planned adjunct to the comparative anatomy class.

BRAIN AND INTELLIGENCE by WARD C. HALSTEAD. University of Chicago Press. $6.00.

This thoughtful work advances a new theory that intelligence is unequally represented throughout the cerebral cortex, with maximal representation in the frontal cortex, thus making the lobes most essential to biological intelligence. The book has a bibliography of 439 titles.

CHEMISTRY AND TECHNOLOGY OF WAXES by ALBIN H. WARTH. Reinhold Publishing Corp., 330 West 42nd St., New York. $10.00.

By far the greater majority of the waxes in use today are biological in origin. Even though this volume covers only their chemistry, it is still of interest to the biologist, if only to know the tremendous range of the subject. The author's present position as chemical director of a nationally known firm specializing in this field gives him an authoritative vantage point from which to speak. The work is well documented and indexed.

DAVISON'S MAMMALIAN ANATOMY revised by FRANK A. STROMSTEN. The Blakiston Co., Philadelphia and Toronto.

This is the seventh edition of a classic manual for comparative anatomy which first appeared in 1903 and has gone on through almost half a century winning new friends and keeping old ones. Each new edition has brought it up to date with the latest discoveries in the field of morphology. The recent work of D. Dwight Davis on the arteries and of Strauss and Sprague on interosseous muscles are incorporated into the text.

ENDOCRINES AND CONSTITUTION IN DOVES AND PIGEONS by OSCAR RIDDLE. Carnegie Institution Publications, Washington, D. C. Cloth $4.00, paper $3.00 postpaid.

This monograph is difficult to classify. It covers so much more than the title indicates. The work started out more than a quarter of a century ago with the hybridizing and segregation of the offspring of 24 pairs of doves showing diverse endocrine-associated traits. But there are many side reports in addition to the original hybridization which is rather curiously handled. There is a wealth of data on the role of body organs, sex, race, season and temperature, in heat production, the influence of age on metabolism, etc.

The last sentence in the publication may best summarize the author's opinion and results: "Some of the institutions developed by man, and some of man's philosophy of life, could be affected by the existing evidence that all men are created biologically unequal."

ENGLISH NATURALISTS FROM NECKAM TO RAY by CHARLES E. RAVEN. Cambridge at the University Press. The Macmillan Co., New York. $6.50.

The two great English universities have put science in their debt for the historical work they have turned out in the various fields of scientific historical research. There must be something after all in their atmosphere of ancient learning to inspire antiquarian interest in the scientists of bygone years. Dr. Raven has given us an altogether readable account of a number of biologists unfamiliar to most of us. He divides his work into three sections—"The Pioneers," "The Populisers," "The Explorers." Under the first are chapters devoted to William Turner, and to John Caius, Thomas Penny and Thomas Mouffet. Under the second grouping are Harrison, Batman, Lyte, Gerard and Topsell. The last large section is devoted to Parkinson, Johnson, How and

Merret. The book concludes with a chapter on Browne and his "Religio Medici." This book is a definite "must" for the adequate library section on biological history.

ESSENTIALS OF PLANT BIOLOGY by FRANK D. KERN. Harper & Brothers, New York and London. $4.00.

The essential and the cognate facts of botany and zoology have been presented so often by so many writers and/or teachers (the two are *not* synonymous) in so much the same fashion that one sometimes wonders if, after all, it isn't the author's name that sells the book. On that basis it will be interesting to see what is the fate of this very new text by a very new author. His writeup in the latest "American Men of Science" is impressive enough, but, even so, it must have taken some courage for him to junk so many traditional adjuncts (no pun intended) of the freshman botany course. Gone, to cite one instance, is the usual long and careful chapter on the bacteria, their growth, habits and effects. They are mentioned a scant dozen times, in passing, but you will search in vain for the difference between a streptococcus or a staphylococcus, or even a common garden variety bacterium. Among modern developments which have not been included are some of the antibiotics. There is likewise no reference to radiation in any form, from the effective wave lengths of light to the effects of radioactive isotopes, or tracer elements. The book is about evenly divided, the first part treating of the manifestation of life or the maintenance of the individual, the second part treating of the perpetuation of life or the preservation of the race, and a supplement in the form of a survey of the plant kingdom from the algae to the various orders of the angiosperms. There are two features of this work that may appeal to the more global-minded. One is the reference to non-U.S.A. plant forms. The other is the use of occasional animal materials. It is high time someone went all out for a purge on isolationism in the biological sciences. The world is an uncomfortably small place as it is. Why botany and zoology in the United States should be as chauvinistic as it is in a post-global-war period is neither strategically nor scientifically justifiable.

EXPLAINING THE ATOM by SELIG HECHT. The Viking Press, New York. $2.75.

The unexpected death of Dr. Selig Hecht within the last year has left American science and Columbia University definitely poorer in the field of biophysics. He was on the ground when Niels Bohr arrived in this country with Lise Meitner's and O. R. Frisch's suspicions regarding uranium-neutron reactions. He was familiar with E. Wigner, E. Teller, V. Wersskopf and E. Fermi to whom Bohr revealed Meitner's suggestions. That was back in 1939. What has passed is epoch-making (or ending) history. This book is perhaps the least technical yet most understandable non-technical publication on the subject that has yet appeared. It well repays careful reading. It should be "required reading" for every member of Congress.

FIELD GUIDE TO BIRDS OF THE WEST INDIES by JAMES BOND. The Macmillan Co., New York. $3.75.

This is a completely rewritten edition of the original work of Dr. James Bond, associate curator of birds in the Philadelphia Academy of Natural Sciences. Anyone who has spent any time in the eastern Caribbean will be interested in the work. Amateur as well as professional ornithologists who are interested in the wintering places of some of our bird migrants will want to add this work to their reference shelves.

FISHES OF THE GREAT LAKES REGION by CARL L. HUBBS and KARL F. LAGLER. Cranbrook Institute of Science, Bloomfield Hills, Michigan.

Midwestern anglers as well as professional ichthyologists will welcome this stoutly bound field manual, with its dark blue fabrikoid covers and long, slim shape, handy enough to slip into a capacious pocket or ruck-sack. It leaves very little to be desired by those who like to settle arguments and doubts in the field. There are 251 excellent illustrations mostly photographs from life. Not the least of the many good qualities in this work are the clear (and not too technical) introductory sections on anatomical features, terms and methods of counting, measuring, collecting and preserving. This is a feature which should commend the work to the ecologically minded.

FUNDAMENTALS OF NEUROLOGY by ERNEST GARDNER. W. B. Saunders Co., Philadelphia and London. $4.75.

This new manual makes a refreshing contribution to the study of neurology in that with only one or two exceptions every illustration is new and uncopied, either a photograph of freshly dissected material or newly prepared slides. The sketches and drawings are also new. On this ground alone the work of Dr. Gardner merits attention and a place on the library shelf.

GENERAL BIOLOGY by JAMES W. MASON. The Macmillan Co., New York, N. Y. $5.50.

LABORATORY EXERCISES IN GENERAL BIOLOGY by JAMES W. MASON. The Macmillan Co., New York, N. Y. $3.25.

The third edition of Dr. Mason's well-known textbook will keep all its former friends and make a number of new ones. The changes from former editions expand the book somewhat but integrate the biological science more closely with chemistry, genetics, ecology and paleontology. The incorporation of the results of war science, notably in the field of antibiotics bring it up to date.

The spiral bound laboratory manual will be a distinct challenge to any instructor, and a revelation to the student. The detachable pages are punched for filing in a standard binder. No pains have been spared to make this work practical and interesting.

GENERAL BOTANY LABORATORY BOOK by E. M. PALMQUIST and L. C. PETRY. W. B. Saunders Co., Philadelphia and London. $2.25.

Here is a most unusual laboratory manual. It is entirely independent of any textbook and goes its own complete way from simple cells through the morphology and physiology of plants all the way from the algae to dicotyledonous forms. We have a feeling that using this laboratory book in conjunction with any standard textbook would approximate adding two more members to the instructional staff. The wonder is why no one has thought up this approach before. Any textbook can be used with it, or, if the reference texts are available, a whole battery of them might be assigned as required readings.

GENERAL ZOOLOGY by TRACY I. STORER. McGraw-Hill Book Company, Inc., New York and London.

This is the ninth impression of the original edition by the Professor of Zoology at the University of California at Davis. Any one who is familiar with many zoological textbooks cannot deny the fact that this one is "packed" with information. It is rare that a book intended for freshman use should be so compendious. On this score the work more closely resembles some of the British works. This book would be ideal for a two semester zoology course.

HEALTH FACTS FOR COLLEGE STUDENTS by MAUDE L. ETHEREDGE. W. B. Saunders Co., Philadelphia and London. $2.50.

There is no need to go into detail regarding the contents of this book. It is sufficient to note that it is the most comprehensive and up-to-the-minute manual on the college level that has appeared on the hygiene textbook horizon in years. It is designed to meet the needs of college women. It will be equally practical for college men.

HORMONES AND HORTICULTURE by G. S. AVERY AND E. B. JOHNSON. McGraw-Hill Book Co., New York and London. $4.50.

Gathering their information from some 734 scattered references in all kinds of publications, the authors have welded them into a coherent and practical handbook for both amateur and professional "lovers of green things growing." The scope of the book is best understood from some of the chapter headings dealing with hormones and rooting of cuttings, treatment of seeds, weed control, dormancy breaking, dormancy inducing, chemical production of new varieties, etc.

MICROSCOPIC ANATOMY OF VERTEBRATES by JAMES I. KENDALL. Lea & Febiger, Philadelphia. $6.00.

This is the third edition of a standard textbook which has definitely caught on because of its eminent practicability. Without undue poaching on premedical human histology the author has built up a practical supplement to standard courses in comparative anatomy and embryology. There are thirteen pages of references to outstanding articles in current histological and anatomical literature. There is also a very lucid chapter on techniques of slide preparation which covers the entire field about as clearly and definitely as anyone could wish.

NUCLEIC ACID by J. F. DANIELLI AND R. BROWN. Cambridge University Press, The Macmillan Co., New York, N. Y. $8.50.

This volume contains the papers presented at the First Symposium of the Society for Experimental Biology held at Cambridge in July 1946. The roster of contributors includes such British names as Gulland, Lythgoe, Todd, Jordan, Astbury, Davidson, Stacey, Danielli, Parsons, Barker, Catcheside, Stedman, Darlington and Koller. Americans represented are Kalckar, Bodun and Stowell. Belgians were Dustin, Jr. and Brachet. Sweden was represented by Caspersson and Hyden. Research workers on nuclear problems in cytology and histology, as well as those interested in cancer or vitamin studies will want to consult the papers presented. The book has no index.

ORGANIC FORM AND RELATED BIOLOGICAL PROBLEMS by SAMUEL J. HOLMES. University of California Press, Berkeley and Los Angeles. $5.00.

There are some biologists who occasionally like to lay aside the more or less mathematical and routine procession of facts they must handle in lecture, laboratory instruction or experiment. They find recreation not in golf, or fishing or even sightseeing expeditions. They like to relax in thought and to stimulate their minds with speculations as to the "why,"—not the innumerable "hows" or "how manys." Here, in this collection of essays from the pen of one of California's "grand old men of biology," those who relish biological philosophy will find much to stimulate their reflective thinking.

Whether one is interested in the problems of organic form or cancer, genes versus Dr. Child's metabolic gradients, or the autocatalytic enzymes and the origin of life, these essays of Dr. Holmes are helpful stimulants to careful thinking—and that is something the scientific world needs in these days of the overwhelming atom.

PLANTS AND ENVIRONMENT by R. F. DAUBENMIRE. John Wiley & Sons, Inc., New York, New York. $4.50.

How the phases of plant science are developing can easily be seen from the fact that this entire book is devoted to a phase of plant ecology which was not even so much as mentioned in the original Plant Ecology of Chicago University's Coulter Barnes and Cowles. Restricted to the autecology of plants, this volume has much to offer the professional general ecologist, the botanist, the forester, and those who are interested in game or range management or agriculture. Some 80 fresh illustrations and a bibliography of over 600 articles cited help to make this text a mine of information.

PLANT BIOLOGY by PAUL WEATHERVAX. W. B. Saunders Co., Philadelphia and London. $4.25.

This second edition of a textbook which first appeared in the midst of the war years will continue to meet the needs of those who must give botany as a survey course, more often than not without the benefit of any formal laboratory work. With its 457 pages and 380 illustrations it is by far the most compact textbook available for this purpose today.

REHABILITATION THROUGH BETTER NUTRITION by TOM D. SPIES. W. B. Saunders Co., Philadelphia and London. $4.00.

This monograph on rehabilitation is one of the University of Cincinnati studies in nutrition at the Hillman Hospital, Birmingham, Alabama. Its purpose is to call attention to the fact that persons debilitated by nutritional deficiencies gain strength promptly following specific nutritive therapy. The dietary schedules and formulae for food preparation at Hillman Hospital are appended.

THE SCIENTISTS SPEAK by WARREN WEAVER. Boni & Gaer, New York, N. Y.

Towards the end of the second world war the United States Rubber Company sponsored a series of short talks on various phases of modern science. These talks were given during the intermissions of the Sunday afternoon concerts of the New York Philharmonic Symphony Orchestra. There are some 79 talks ranging through the whole field of science, 40 of them are biological. The authors are the unquestioned leaders of their fields in this country.

SEXUAL BEHAVIOR IN THE HUMAN MALE by A. C. KINSEY, W. B. POMEROY, C. E. MARTIN. W. B. Saunders Co., Philadelphia. $6.50.

From the start of human society down to this year there have been many books and innumerable *obiter dicta* written on sex phenomena. At last we have been given carefully collated statistical data for the first time in the work of Dr. Kinsey and his associates. In this presentation of objective facts, strictly avoiding social or moral interpretations of these facts, the authors are careful to point out that "scientists have no special capacities for making such evaluations."

Our startling revelation will probably be passed over in silence by the "wowsers" although the vast majority of ex-service students could have made the same observation out of their own experience. This is that there is very little truth in the oft-mouthed assertion that military life is conductve to sexual overindulgence. It is refreshing to discover that "very few men in the forces are as active sexually as they would have been at home in times of peace."

Other carefully documental conclusions shatter another too frequently repeated dogmatism that this "younger generation is going to the 'demnition bow-wows.'" The authors are forced to conclude that the present generation is as moral sexually as their fathers were!

This is the type of book which will inevitably be pushed as a "best seller," which will to some extent bring it into disrepute in some areas. That the authors have made a real contribution to American sociology, psychology and moral theology is unquestioned.

THE STRUCTURE AND REPRODUCTION OF THE ALGAE, Vol. II by F. E. FRITSCH. Cambridge at the University Press, The Macmillan Co., New York, N. Y. $12.00.

This is the long awaited second volume in the set which appeared sometime before this last war. The first volume was devoted to the fresh and salt water green algae, and cognate forms throughout the world. This second volume takes up the brown, red and blue-green algae and thus completes the study of the field. The treatment of this matter occupies some 937 pages, with some 335 plates, most of them full-page. As the most recent and complete work on the subject it bids fair to become the standard reference on the morphological phases of the subject. The foreword will prove invaluable to marine ecologists.

TEXTBOOK OF BACTERIOLOGY by Thurman B. Rice. W. B. Saunders Co., Philadelphia and London. $6.50.

This fourth edition of Dr. Rice's well-known manual brings it as up to date as any textbook could reasonably claim to be in a field which undergoes such constant changes as bacteriology. The introduction of so many tropical diseases into the country as a result of the second world war and the development of the antibiotics and chemotherapeutic agents for which the war was responsible are all incorporated into the work. The author's measured words in the last two paragraphs regarding "miracle drugs" would bear repetition over and over again in some more promiscuous site than the last page of a bacteriological textbook.

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CHAPTER OFFICERS AND NEWS LETTERS

BETA

—University of Michigan

President—Rodgers D. Hamilton, University Museums.

Vice-President—Ann van der Wounde, Department of Zoology.

Recording Secretary—Jeanne Moore, Department of Zoology.

Corresponding Secretary—Kurt Benjamin, Department of Medical Statistics.

Treasurer—Mrs. Betty Jalosky, Laboratory of Vertebrate Biology.

Council Representative—Dr. Karl F. Lagler, Department of Zoology.

EPSILON

—University of Denver

President—Norma Moe, 906 South Vine, Denver, Colorado.

Vice-President—Donald Walcott, 549 Pennsylvania, Denver, Colorado.

Corresponding Secretary—Clay Berg, 206 South Lafayette, Denver, Colorado.

Treasurer—Donald Walcott, 549 Pennsylvania, Denver, Colorado.

Council Representative — Frederick Zeiner, 1417 South Elizabeth, Denver, Colorado.

ZETA

—University of Wisconsin

President—Thomas Theis, Department of Plant Pathology.

Vice-President — August Gorenz, Department of Plant Pathology.

Recording Secretary—Peter K. Nelson, Department of Botany.

Corresponding Secretary — Phoebe Green, Department of Botany.

Treasurer—Acton R. Brown, Department of Agronomy.

ETA

—University of Akron

President—Bill Meese, 85 East Brookside Avenue, Akron, Ohio.

Vice-President — Aubrey Allman, 803 Ranney Street, Akron, Ohio.

Secretary—Eugenia Mamay, 614 Whitney Avenue, Akron, Ohio.

Treasurer—Robert P. Baker, 722 Sunset View Drive, Akron, Ohio.

Council Representative — John Van Sickle, 265 Gordon Drive, Akron, Ohio.

Our last chapter report was in the December 1946 issue. It included notice of the new roster of officers elected in September 1946. A partial change in officers was made during the second semester, as recorded in the May 1947 BIOLOGIST.

At the National Meeting in Boston, December 1946, President Margaret Grismer represented the chapter.

In January 1947 Margerie Brett, Betty Enderlein and Martha Stoler were elected as members. At the close of the semester in February, Alice Kinney, Doris Lancaster and Thomas McQuay became active members. Also, seven persons were pledged. It became necessary to replace our vice-president, Thomas McQuay being elected, and our secretary, the new one elected being Martha Stoler.

At two program meetings during the semester, Mr. Vanica presented some unusual movies and Dr. Acquarone spoke on Fluorescent Minerals.

Additional members who had fulfilled all requirements were elected at the close of the semester and initiated at a regular meeting at the home of Dr. Kraatz, Sunday, June 13. These new actives included Heraldine Heminger, Eugenia Mamay, Marjorie Post and Ted Suie. A number of persons were pledged also.

Most of the new members of the year were seniors and we lost nearly all of them at commencement. Likewise, all of the officers except one were graduated.

Margaret Grismer went to the University of Wisconsin for graduate work in zoology. Ted Suie is doing graduate work in bacteriology at Ohio State University. Marjorie Post is in Pharmacy School at Ohio State University and Heraldine Heminger is teaching nurses at Children's Hospital, Akron.

The following are technicians at City Hospital, Akron: Margerie Brett, Alice

Kinney, Martha Stoler. Doris Lancaster is at People's Hospital, while Betty Enderlein is at Rowan Memorial Hospital, Salisbury, North Carolina. Thomas McQuay is teaching at Barberton High School.

Two of our alumni, members and officers of the chapter in recent years, received their Master's degrees recently. George Anastos received his at Harvard in June 1947 and Dick Weaver at Ohio State University in December 1947. Both majored in entomology.

In the school year 1947-1948, we started with new officers: Bill Meese, president; Eugenia Mamay, secretary, and one holdover, Aubrey Allman, now an instructor and doing some graduate work, acting as vice-president and treasurer.

At a meeting on Sunday, December 14, at the home of Dr. Kraatz, the following new faculty members were initiated: Mrs. Colien, Mrs. Boguslavsky, Mrs. Katz and Miss Park. Robert P. Baker became an active member and new pledges were named.

In January, Dr. Kraatz and Mrs. Robinson of the faculty reported on meetings of the A.A.A.S. which they attended in Chicago.

After completing their requirements at the end of the semester, Leo Anastos, Nina Mamay, and Elinor McQuay were initiated into active membership at a meeting on Sunday, March 21 at the home of Dr. Kraatz. Also nine more persons were pledged. Robert Baker assumed now the duties of Treasurer.

KAPPA

—University of Kansas

President—T. Wayne Porter, Room 404, Entomology Department, Snow Hall.

Vice-President—Arthur Chapman, 20-A Sunnyside, Lawrence, Kansas.

Recording Secretary—Alice Timpe, 621-B Snow Hall.

Treasurer—Mr. Loy Morgan, 326 Snow Hall.

Council Representative—Ronald McGregory, 410 Snow Hall.

The following were recently initiated into the Kappa Chapter of Phi Sigma: Elvin Altenbernd, Irwin Baird, Leona Braschi, Jerry Brown, Paul Christian, Wayne Culver, Robert Delphia, Earl Edwards, Byron Eberle, Lewis Goyette, William Hetzer, Wesley Innes, Lawrence Lackey, Joan Jay, Keith Jensen, William Jenson, Donald Marchbanks, Willard Madison, H. Gordon Montague, Thelma Neff, George Omer, Jr., Roslyn Pauker, George Prlain, Carlon Pryor, Oscar Resnick, Alexander Roth, Charles Smith, Emilio Soler, Jennie Spoelstra, Esther Stubblefield, Wilmer Tanner, Elton Schroder, Donald Van Devander, Jimmy White, Richard White, Henry Wise, Jr., Gilbert Winemiller, Francis Wolfskill, David Lucker, Mary Ruscha.

LAMBDA

—Montana State University

President—John VanLandingham, 3000 South Higgins Street, Missoula, Montana.

Vice-President—Pat Dehnert, 501 University Avenue, Missoula, Montana.

Recording Secretary—Betty Hyde, 501 University Avenue, Missoula, Montana.

Council Representatives—Dr. L. G. Browman, 664 South 6th Street, East, Missoula, Mont. Dr. R. A. Diettert, 155 Mount Avenue, Missoula, Montana.

NU

—Washington and Jefferson College

President—James Hawkins, 166 South Wade Street, Washington, Pennsylvania.

Recording Secretary—William Keeler, 246 East Beau Street, Washington, Pennsylvania.

Treasurer—Thomas McKee, Phi Gamma Delta House, Washington, Pennsylvania.

Council Representative—Dr. Clarence D. Dieter, Washington, Pennsylvania.

PI

—Emory University

President—William E. Brillhart, Department of Biology.

Vice-President—Fred C. Shearer, Department of Biology.

Recording Secretary—Genevieve H. Alexander, Department of Biology.

Corresponding Secretary—Garland Perdue, Department of Biology.

Treasurer—William D. Hogan, Department of Biology, Emory University, Georgia.

Activities of Pi Chapter for the past year have centered around increasing our active membership and promoting our pronounced objective of bringing about greater interest in biological research among undergraduate members.

The Fall Quarter started off with a bang when twelve new members were initiated. They are: J. Walter Beck, Clara Elizabeth Dunn, Genet Heery, Jesse H. Hobbs, Ann Martin, Patricia Ann McManmon, Garland D. Perdue, Jr., Ruth C. Richardson, (Mrs.) Mattie Lou McCullough Smith, Jean Stewart, Wallace W. Taylor, Charles H. Wharton.

Pi Chapter also sponsored a picnic at the home of one of our faculty members during the fall.

The highlight of the Winter Quarter was a report on some collecting experiences in the Philippines by Charles H. Wharton, an undergraduate member of Pi Chapter. Phi Sigma also sponsored a film on the physiological aspect of malaria in Rhesus monkeys in the month of February. Both of these meetings were well attended and drew many favorable comments.

Plans for the Spring Quarter include election of new officers and an outing to which all the members of the Biology Department will be invited.

RHO

—University of Illinois

President—George J. Ludvik, 127 Natural Resources Building, Urbana, Illinois.

Vice-President—Robert C. Honea, 151 Natural History, Urbana, Illinois.

Recording Secretary—Wilbur L. Bullock, 345 Natural History, Urbana, Illinois.

Treasurer—Glen S. Winterringer, 216 Natural History, Urbana, Illinois.

Council Representative—Virginia Brennan, Office 345 Natural History Building.

SIGMA

—University of Forida

President—Jon L. Herring, Department of Biology, Gainesville, Florida.

Vice-President—S. Kendrick Eshleman, Department of Biology, Gainesville, Florida.

Secretary—Elbert Cammack, 139 Flavet II, Gainesville, Florida.

Treasurer—F. S. Stansberry, Department of Botany, Gainesville, Florida.

Council Representative—Dr. H. K. Wallace, Department of Biology, Gainesville, Florida.

At Sigma Chapter's winter and spring initiations a large number of students, most of them doing graduate work in the Biological Sciences, and several new faculty members have been accepted in Phi Sigma. We happily feel that our increasing number of members is indicative of a very significant increase of Biological interest at the University of Florida.

At our March meeting, Sigma Chapter members were privileged to hear an interesting talk on "Murine Typhus in Florida," by Dr. E. R. Rickard of the Rockefeller Foundation. At present Dr. Rickard is director of a field laboratory of the Rockefeller Foundation in Tampa, Florida, where he is engaged in research on Typhus Fever. Dr. Rickard is noted for his work on Hookworm and Yellow Fever in South America. Previous to his present work on Typhus Fever, Dr. Rickard also did outstanding research on the Influenza Virus.

Last semester the Biologists enjoyed an excellent discussion by Dr. J. H. Davis, of the University's Botany Department, concerning the fascinating Mangrove swamps of Southern Florida. These are probably the state's most characteristic and widespread tidal marshes, and often form on muddy, flat shores, in estuaries and near the mouths of rivers. The Mangrove roots are the habitats of numerous burrowing animals and climbing Gobies, and large numbers of tropical birds and mammals live among the Mangrove branches throughout the year.

UPSILON

—Miami University

President—Paul Daniel, 118 East Withrow, Oxford, Ohio.

Vice-President — Lois Pierson, North Hall, Oxford, Ohio.

Recording Secretary — Ruth Drummond, North Hall, Oxford, Ohio.

Treasurer — Marjorie Newton, East Hall, Oxford, Ohio.

We have had a very interesting and varied program this year. On January 8 Dr. Cutright, Associate Entomologist of the Agricultural Station at Wooster, Ohio, spoke to the group on several new insecticides and some of the many problems involved in field operations.

Following a field trip to Bat Cave in Carter Co., Kentucky, a symposium on Speleology was presented by four of the members: Jo Wolters, Jim Shideler, Norm Negus, and Paul Daniel, our president. They spoke on cave formation, cave fish, mammals, and amphibians, respectively.

On February 19, Dr. Orton K. Stark of our Bacteriology Department, spoke on the bacteriological phase of Biological Warfare.

On March 15, the group took a field trip down to the Cincinnati Zoo. Most of the animals were inside but we still had a lot of fun.

Our annual field trip and initiation will be held on May 22.

Mary B. Abbett, Rodger L. Alspach, Thomas J. Binnall, Marian E. Carroll, John W. Cullen, William T. Davin, Paul F. Dietzel, William E. English, Gladys L. Frazier, Bess L. Hayner, Dorothy J. Henrich, Marilyn J. Herr, Gloria A. Hibler, Nancy J. McDermott, Sandford H. Meyers, Loris E. Miller, Robert C. Millonig, Thomas F. Redick, Edward T. Reineke, Catherine B. Schatz, Kenneth M. Schreck, Katherine J. Swinehart, Elizabeth G. Walker, Dorothy M. VanAusdal, Vena J. Weber, Robert S. Zerkle.

PHI

—University of New Hampshire

President—Mr. Ronald Towne, Nesmith Hall, Durham, New Hampshire.

Vice-President—Miss Majorie Dunnells, Nesmith Hall, Durham, New Hampshire.

Recording Secretary—Miss Jean Hall, Nesmith Hall, Durham, New Hampshire.

Corresponding Secretary — Miss Joyce Mitchell, Nesmith Hall, Durham, New Hampshire.

Treasurer—Mr. Dale Grim, Nesmith Hall, Durham, New Hampshire.

Council Representative—Dr. C. F. Jackson, Department of Zoology.

Phi Chapter started the present school year in true Phi Sigma style by going on a weekend expedition to the Isles of Shoals, 12 miles off the coast of New Hampshire. Professor Jackson skippered his boat, Shankhassick III, in true salty fashion, making a perfect landing at Babb's Cove, Appledore, in darkness and dense fog. After making headquarters at Celia Thaxter's former home, the "crew" ate a hearty supper and bunked down for the night on broad porches overlooking the sea. The next day, avid biologists combed the island in search of everything from the Scarlet Pimpernel to tiny bi-valves.

On November 19, Dr. Lester Whitaker, U.N.H. alumnus, gave an informative talk on the pathology of the gall bladder, explaining the formation of gall stones and their removal.

Phi Chapter formally initiated 35 pledges into membership at a semi-formal banquet held at the Exeter Inn, March 17. The guest speaker was Dr. Douglas E. Wade, Dartmouth College Naturalist. He gave an illustrated talk on the habits and habitat of the Peregrine Falcon.

Other notable programs have included an Ecology roundtable, a lecture on Bio-plastics, and several movies.

Plans are underway for our annual spring camping trip to the "north country." This is in keeping with our belief that a good biologist is also a good outdoorsman.

Phi Chapter, Phi Sigma 1948 Pledges: Pierce Beij, Robert Benson, Donald Bent, Kenneth Bradley, David Buttrick, David Cleasby, Elmer George, Frederick Gowen, Albert Grass, Clifford Hudson, Richard Kerwin, Joseph Lamy, Richard Lane, Earle Leavitt, Maxim Leavitt, Sylvia MacIntyre, Charles McLaughlin, Lois Milbury, Douglas Murphy, Waldron Newell, Audrey Parker, Richard Ravgiala, Donald Rice, Preston Roberts, James Rock, Philip Sawyer, Suzanne Sickmon, Mark Smiley, Melvin Slotnick, Mary Sullivan, Charles Thayer, Merrick Tibbetts, Dirk Van der Voet, David Weiner, Percy Wilson, Harvel Winkley.

CHI

—Montana State College

President—Helen Mott, Quad B, Bozeman, Montana.

Vice-President—Doris Humphrey, 204 South 3rd, Bozeman, Montana.

Recording Secretary—Henry Kathrein, 618 West Babcock, Bozeman, Montana.

Treasurer—Alice Johnson, Quad C, Bozeman, Montana.

Council Representative—Herold R. Watling, Department of Zoology and Entomology.

PSI

—University of Washington

President—Alfred Borg, 4311 Brooklyn, Seattle 5, Washington.

Vice-President—Robert Stapp, 7427 Corliss Avenue, Seattle 3, Washington.

Recording Secretary — Eloise Giblett, 612 North 46th Street, Seattle 3, Washington.

Treasurer—Norman Johnson, 853 Ranier Hall, Seattle, Washington.

Council Representative — Dr. Melville H. Hatch, 4623 21st NE, Seattle 5, Washington.

OMEGA

—University of Oklahoma

President—Earl Kilpatrick, Zoology Department, Norman, Oklahoma.

Vice-President—Marie Unzner, 707 W. Boyd, Norman, Oklahoma.

Recording Secretary — Patsy Fowler, Biology Department, Norman, Oklahoma.

Treasurer — Glenna Swanda, Norman, Oklahoma.

At the first business meeting of the year, members of Omega Chapter decided to hold two meetings monthly, one a business meeting and the other a program meeting.

The first guest of Omega Chapter was Mr. Dick Byrd, Fellow in the Royal Society of Zoology, of Regina, Saskatchewan, Canada. His colored movie featuring birds of North America, "Camera Trails Along Nature's Trails" was shown for the third time in the United States for members and their guests.

At the second program meeting, the faculty of the Zoological Sciences and Plant Sciences Departments informally explained the most interesting aspects of their research at the University. They told of opportunities in research for the student in their particular fields. Seventeen faculty members participated.

On November 20, in cooperation with Sigma Xi, Phi Sigma brought Dr. M. Ruiz Castenada to the campus to lecture on "Brucellosis." Dr. Castenada, an honorary member of Phi Sigma, is director of the Laboratory of Medical Research at the Mexico General Hospital. He discussed the symptoms and incidence of brucellosis, diagnostic tests and treatments developed in his laboratory. Afterwards members of Phi Sigma entertained Dr. and Mrs. Castenada with a reception. Members Lu Hellund, June Rawley and Bill Wood were in charge of arrangements. Patsy Fowler and Marie Unzner poured and Glenna Swanda served.

Besides the new members, the roll of Omega Chapter for 1947-48 now contains thirty-eight faculty members and twenty-five active members.

The following were initiated into Omega Chapter 12 December 1947: Mary Alice Archer, Josie Bailey, Cecillie Blockley, Rosemary Chancey, David Clemans, Mrs. Helen Conrad (Faculty), Genevieve Dale, Joe Duncan, Irvin Fishman, James Fite, Billye Grammer, Glowrine Herth, Joe Hoffman, Joe Horton, Moss Johnson, Allen Marr, Martha Jean McClure, Marjorie Nash, William Penfound (Faculty), Bryce Petrie, Hubert Ward, Robert Webb, Cecil Williams.

Dr. E. R. Hall, Director of the Museum of Natural History, University of Kansas gave the address on "Between the Subspecies."

Omega Chapter honored itself in nominating to honorary membership Dr. Laurence H. Snyder, Dean of the Graduate School at the University of Oklahoma. Dr. Snyder who was initiated on 12 December 1947 is a zoologist in his own right. A native of Kingston, New York, he graduated from Rutgers in 1922 and took both his master's and doctoral degrees in science at Harvard in 1924 and 1926 respectively. He was successively attached to the genetics section of the Carnegie Institution, teaching fellow at Harvard, instructor, assistant and associate professor at North Carolina State College, and more recently professor and chairman of the department at Ohio State University. He has served on the Committee on Blood Grouping of the National Research Council and Chairman of the Committee on Human Heredity. His editorial experience was gained in charge of the "Ohio Journal of Science" and as member of the editorial board of "Eugenical News." He is a member of many scientific societies in his biological field.

Phi Sigma welcomes Dr. Snyder and congratulates Omega Chapter on its perspicuity in consistently choosing for honorary membership men of Dr. Snyder's caliber. They honor Phi Sigma in joining our circle.

The following were initiated into Omega Chapter 8 April 1948: Thomas E. Nix, Edmund H. Gleason, Allen Lawrence, Fred R. Hood, Jr., George H. Jennings, Wayburn S. Jeter, Burton A. Deming, Paul B. McCay, Robert M. Jenkins, Donald E. Payne, Orville U. Holt, John R. Findlay, Kenneth O. Adwan, Simon H. Wender (Faculty), John C. Burton, Wilma Bias, Francis W. Nossaman, Kermit E. Sneed.

A joint banquet was held in the Woodruff Room of the Student Union Building with Alpha Epsilon Delta (honorary Pre-medical fraternity) and Lambda Tau (Honorary Fraternity for Laboratory Technicians). Dean Laurence H. Snyder gave the address on "Heredity in Modern Life."

ALPHA ALPHA

—University of Southern California

President—John M. Pierson, 236-23rd Street, Santa Monica, California.

Vice-President—Leroy W. King, 3517 Delta Street, San Gabriel, California.

Recording Secretary—Bernice Porteous, 445 North Irving Boulevard, Los Angeles, California.

Treasurer—Howard A. Winter, 4234½ Kenwood Avenue, Los Angeles 37, California.

ALPHA BETA

—Mount Union College

President—Chester Benjamin, 604 N. Lincoln, Alliance, Ohio.

Vice-President — Jacqueline Knoll, Elliott Hall, Alliance, Ohio.

Recording Secretary—Mildred Glauser, 2105 South Arch, Alliance, Ohio.

Corresponding Secretary — Robert Ohler, 816 Ohio Street, Alliance, Ohio.

Treasurer — Marilyn Wallam, 2121 Ridgeword Avenue, Alliance, Ohio.

Council Representative—Dr. O. H. Engle, 1409 Robinwood Road, Alliance, Ohio.

Alpha Beta Chapter enjoys regular monthly meetings. The first of the three most significant meetings consisted of a lecture in October on a study of Canadian plant life illustrated by Kodachrome slides given by Dr. Elliott Stauffer of Eastman Kodak Company, Rochester, New York. Dr. Albert Wild, an Alliance surgeon, presented in December a lecture, illustrated by films, on three surgical operations. In March the Chapter held a banquet at which an illustrated lecture on Australia and the Philippine Islands with emphasis upon Schistosomiasis was given by Dr. Hunninen (a new member of Alpha Beta Chapter) of the Biology Department of Mount Union College. Our present membership is thirty-seven members with sixteen initiated in November and eleven initiated in March.

ALPHA ETA

—Oklahoma Agricultural and Mechanical College

President—W. C. Rhoades, Entomology Department, Stillwater, Oklahoma.

Vice-President—F. B. Cross, Jr., 1515 W. 9th Street, Stillwater, Oklahoma.

Recording Secretary—M. C. Bachman, Zoology Department, Stillwater, Oklahoma.

Treasurer—G. E. Hall, Box 104, V. V., Stillwater, Oklahoma.

ALPHA IOTA

—Bucknell University

President—Joseph Territo, Theta Chi House, Lewisburg, Pennsylvania.

Vice-President — Daniel Gross, Sigma Alpha Mu House, Lewisburg, Pennsylvania.

Recording Secretary — Patricia Roos, Hunt Hall, Lewisburg, Pennsylvania.

Treasurer—Lawrence Trabaudo, Theta Chi House, Lewisburg, Pennsylvania.

We have reorganized our chapter from scratch since it was so depleted during the war. The following is a report of the few organization meetings and activities that we have had:

October 27, 1947—The pledging of new members was discussed at this meeting. It was decided to invite those students that had completed 20 hours in Biology and maintained an average of eighty-five. Average scholastic marks must be 80. A petition was read and discussed from the College of Puget Sound, Tacoma, Washington, asking us to initiate one of their pledges who has transferred to Johns Hopkins University. This was tabled for more information. We also discussed having in the near future three speakers for our meetings.

November 6, 1947—This meeting was taken up with the selection of pledges and explaining the qualifications that they must have. The list accepted for pledging was 23 students.

November 20, 1947—This meeting was held for the benefit of students eligible for Phi Sigma. Aims and Purposes of the organization were discussed. Dr. Tasker, faculty advisor, commended the students for attaining such high scholastic standard and welcomed them into the organization. Under the auspices of Phi Sigma, we arranged to have the following week an open meeting for all students interested in a talk by Dr. A. Nicodemus, obstetrician specialist. Approximately one hundred students and faculty attended that meeting.

December 11, 1947—Pledges were formally initiated and short talks were given by faculty members. The new members selected their research problems and were assigned to individual faculty members. Past copies of the *Biologist* and research problems were shown. Twenty-two people were initiated.

ALPHA KAPPA

—Hunter College

President—Helen Stapf, 4344 Richardson Avenue, New York, New York.

Vice-President—Angelina Messina, 1140 Fox Street, New York 59, New York.

Recording Secretary—Barbara Friedrich, 366 West 25th Street, New York, New York.

Treasurer—Barbara Friedrich.

Council Representative—Rose Grandinetti, 3315 Broadway, New York 31, New York.

The following were initiated into the Alpha Kappa Chapter on Sunday afternoon, January 11, 1948: Ann Buchen, Gertrude Ellenberg, Mary Fox, Jessie Goldstein, Erica Joshua, Hilda Markoff, Patricia Eleanor McAuley, Barbara Orski, Edith Stavisky, Marianne Wolff, Shirley Mallin Amster.

The initiation was celebrated later in the evening by a banquet held at Hans Jaeger's Restaurant.

In subsequent meetings plans were made for putting into action a proposed project, that of determining if Endamoeba histolytica exists normally in the caecum of the experimental animal-the hamster. Up to date, two animals have been dissected, and permanent smears made which are now in the process of being stained. A later letter to this publication will elaborate on these findings.

In addition to this project, Alpha Kappa has had as speakers Dr. Vera Koehring of Hunter College, who elaborated on "100 Years of Darwinism," and Dr. Albert Sobel of the Jewish Hospital, who discussed his investigations of vitamin-A in a talk, "Vitamin Deficiency on an Adequate Intake." Our next speaker will be Dr. Anthony Rottino of St. Vincent's Hospital, who will tell of his work with patients suffering from the obscure and fatal condition known as "Hodgkin's Disease."

To these speakers for their excellent talks, and to the members of the Biology Department of Hunter College who have done so much to make our frequent meetings and project possible, this chapter extends its sincerest thanks and appreciation.

ALPHA LAMBDA

—University of Utah

President—John C. Downey, Salt Lake City, Utah.

Vice-President—Earl W. Smart, Salt Lake City, Utah.

Recording Secretary—Betty Gunderson, Salt Lake City, Utah.

Treasurer—Ernest J. Roscoe, Salt Lake City, Utah.

Council Representative — Dr. William H. Behle, Department of Biology, Salt Lake City, Utah.

Recent addition to the teaching staff of the Botany Department is Mr. Stillings from Ohio State University who will teach classes in Applied Botany.

Dr. Behle, the representative of the *Biologist* on this campus, has contacted some members and reports on future publications seem to be promising.

Recent initiates of the Alpha Lambda Chapter of Phi Sigma received their certificates on February 4, 1948 at the home of Dr. William H. Behle. The initiated were: Bert Atwater, Botany; Gabriel William Comita, Zoology (Limnology); Douglas Morey Dearden, Zoology (Genetics); Lyle Conway Dearden, Zoology (Mammology); John C. Downey, Zoology (Entomology); William Virgil Hawkes, Jr., Zoology (Histology); Lester Heward, Botany; Warren Lewis, Zoology (Entomology); David E. Lofgren, Botany; James Saville McCloy, Zoology (Entomology); Arthur Agle Millecan, Jr., Biology Composite; Beth Morrison, Zoology; DeEtte Lillian Richards, Biology; Shirley Melba Shreeve, Botany; Earl W. Smart, Biology Composite; James Victor Smith, Zoology (Entomology); Yu-hsi M. Wang, Zoology (Arachnology); Charles Martin Woolf, Zoology; Raymond E. Gilbert (Faculty), Zoology (Genetics).

ALPHA MU

—University and State College of Oregon

President—William Baker, 434 N. 29th Street, Corvallis, Oregon.

Vice-President—Burr Clouette, 117 N. 15th Street, Corvallis, Oregon.

Recording Secretary—Miss Jerre Kimmell, Alpha Delta Pi, Corvallis, Oregon.

Treasurer—Lew Wallace, B2 Apartment 2, Adair Village.

Council Representative—Dr. Ethel I. Sanforn, 221 N. 28th Street, Corvallis, Oregon.

ALPHA NU

—University of New Mexico

President—Betty Sheedy, Biology Department, Albuquerque, New Mexico.

Vice-President—William Widner, Biology Department, Albuquerque, New Mexico.

Recording Secretary — Mrs. Mildred Hill, Biology Department, Albuquerque, New Mexico.

Treasurer—Gene Sumrell, 114 South Yale Avenue, Albuquerque, New Mexico.

Council Representative—Myrtle Greenfield, Director State Health Lab'ty, Albuquerque, New Mexico.

Four program meetings were held this year with talks given by Alpha Nu members. Dr. E. F. Castetter, Head of the department of biology at the University of New Mexico, gave an illustrated lecture on the "Plant Life of New Mexico" on October 16, 1947. A talk on the "Contributions of the American Indian" was given by Mrs. Mildred S. Hill on November 20, 1947. Mr. W. R. Widner discussed some work he has been engaged in on the "Megagametogenesis of Zia Mais" on February 19, 1948, and Mr. R. D. Ivey, a new arrival to the University, gave, on March 18, 1948, a very interesting survey of work on the "Mammals of Palm Valley, Florida."

At its last meeting, this chapter elected new officers: President, Larry Gordon; Vice-President, Ferd Sumrell; Secretary-treasurer, Diana H. Hinman, and Publicity, Shirley Crist.

New members were also elected and will be initiated on April 30, 1948. The ceremony will be followed by the traditional banquet at which Mr. Martin W. Fleck will be the main speaker. Mr. Fleck is a member of the faculty and has been asked to talk on the very pertinent new work "Sexual Behavior in the Human Male." The six new members are: "H." "C." Cox, Gilbert Gutierrez, Frank Viquesney, and Roger Wotkyns, actives; and Dr. Richard B. Johnson and Mr. Ward L. Sims, faculty.

Alpha Nu Chapter is looking forward to increased activity in the coming year. We would also like to extend our greetings to all the chapters of Phi Sigma Society in the hope that they may grow and further shed their "biological light."

ALPHA XI

—Rhode Island State College

President—Ellen Swanton, Kingston, Rhode Island.

Secretary—Marilyn D. Hindle, Kingston, Rhode Island.

Treasurer—Jean Burns, Tau Alpha Epsilon Sorority, Kingston, Rhode Island.

Council Representative — Dr. Donald Zinn, Zoology Department, Kingston, Rhode Island.

Alpha Xi Chapter has been trying to bring its program back to its pre-war standards. We are planning a series of open meetings this spring, featuring well-known specialists in the biological field. On March 31, Mr. Philip Barske, wild life conservationist for the federal government, spoke before an open meeting of the society. We have several more lectures scheduled before June.

Other prospective events include a spring initiation, a picnic, a banquet, and publication of our annual magazine, *The Cell.*

We initiated two faculty members this fall: Mrs. Frances Bessette, and Dr. James Darlington. New student initiates include Albert Abramovitz, Bernice Anderson, Stanley Cornish, Henry Bessette, William Cowen, Ingrid Berglund, Rogers Almy, Eugene Lipsey, Galvin Giusti, Margaret Gilbert, Gertrude Leacy, Dexter Haven, and Robert Spencer.

ALPHA OMICRON
—Marquette University

President—Mr. Jesse M. Caskey, Zoology Department, Milwaukee, Wisconsin.

Vice-President—Mr. Stanley J. Peloquin, 3060 North Hackett Ave., Milwaukee, Wisconsin.

Recording Secretary—Mr. Henry Wisniewsky, Zoology Department, Milwaukee, Wisconsin.

Corresponding Secretary — Miss Mary Ann Swaebly, 825 North 14th St., Apt. 6, Milwaukee, Wisconsin.

Treasurer—Mr. A. Joseph Gillan, 4632 West Medford Avenue, Milwaukee, Wisconsin.

Council Representative—A. Joseph Gillan, % Milwaukee Public Museum, Milwaukee, Wisconsin.

ALPHA PI
—University of Colorado

President — Karl Raven, 955 Penn Street, Boulder, Colorado.

Vice-President — Sheila Counce, 1134 Pleasant, Boulder, Colorado.

Recording Secretary—Kathleen Dever, 1545 Walnut, Boulder, Colorado.

Treasurer—Ruth Ann Wolf, 118 McKenna, Boulder, Colorado.

Council Representative—Mr. Karl Raven, 955 Penn., Boulder, Colorado.

The Alpha Pi Chapter at the University of Colorado, Boulder, Colorado, recently changed their requirements for membership to read as follows:

(1) The Alpha Pi chapter of Phi Sigma Society shall consist of active, faculty, alumni, and honorary members.

(2) The following shall be the qualifications for active membership:
  (a) at least Junior standing,
  (b) at least twenty-four quarter hours in biology courses with at least a 2.0 (B) average,
  (c) at least a 1.5 average exclusive of biology courses,
  (d) a residence period of at least one quarter at the University of Colorado before being considered for membership,
  (e) completion of at least one biology course within the last calendar year or within the last year in school, and
  (f) recommendation of one faculty member and one active Phi Sigma member.

(3) Active members shall be in one of the following classifications:
  (a) Major in biology.
  (b) Major in medical technology or premedical major.
  (c) Graduate students having a major or minor in biology.
  (d) Students having a distributed major with biology as one of the major fields.

ALPHA RHO
—University of Arkansas

President — Lehman C. Fowler, Box 1070, Fayetteville, Arkansas.

Vice-President—Vernon Hall, 911 North Lindell, Fayetteville, Arkansas.

Recording Secretary—Fred Wetzel, 226 Ozark, Fayetteville, Arkansas.

Treasurer—E. G. Dooley, Sigma Alpha Epsilon House, Fayetteville, Arkansas.

Council Representative — Dr. Delbert Swartz, Room 106, Home Economics Building, Fayetteville, Arkansas.

ALPHA SIGMA

—University of Texas

President—V. Rae Phelps, Zoology Department, Austin, Texas.

Vice-President—Maurice Grossman, 721 Park Boulevard, Austin, Texas.

Recording Secretary—Leo Mericle, Department of Botany, Austin, Texas.

Corresponding Secretary—Mary L. Alexander, Department of Zoology, Austin, Texas.

Treasurer—Andrew J. Rowe, 2802 Rio Grande, Austin, Texas.

Council Representative—Addison Lee, Department of Botany, Austin, Texas.

Alpha Sigma of Phi Sigma held its initiation and annual banquet in the Mural Room of the Austin Hotel on November 13, 1947.

Dr. Lawrence H. Snyder, Dean of Graduate School and Professor of Medical Genetics at the University of Oklahoma, was the principal speaker. His topic was "The Practical Application of Genetics to Medical Problems." The invocation was given by Reverend Balfour Patterson. Dr. C. P. Oliver, Professor of Zoology, introduced Dr. Snyder. Dr. O. P. Breland was toast master.

The new initiates are Gerald Brickman, Edna Dudgeon, William F. Evand, Mary Sue Hart, Robert Hedeen, James Johnston, Donald Killelea, J. R. Kroschewsky, Jimmy Leece, Lenord Moise, Margret Ann Neville, Thane Sponsel, Newsom Stool, Samuel R. Wiley, William Woodard and Garland Russell.

The officers of Alpha Sigma for 1947-48 were Rae Phelps, President; Maurice Grossman, Vice-President; Jack Rowe, Treasurer; Leo W. Mericle, Recording Secretary; Mary Louise Alexander, Corresponding Secretary; and Ruth Bitter, Reporter.

ALPHA TAU

—National University of Mexico

President—Dr. Eusebio Davalos Hurtado, 2A Merced Gomez 32, Mixcoac, D. F., Mexico.

Recording Secretary — Miss Johanna Faulhaber, Dept. de Antropologia Fisicz, Museo Nat'l de Antropologia, Moneda No. 13, Mexico D. F., Mexico.

ALPHA PHI

—College of Puget Sound

President—James Stewart Legg, Tacoma, Washington.

Vice-President—Rodney Allison Brown, Tacoma, Washington.

Secretary—Thelma June Smith, Tacoma, Washington.

Treasurer—Murray Leathers Johnson, Tacoma, Washington.

The Alpha Phi Chapter of Phi Sigma was installed at the College of Puget Sound, Tacoma, Washington, on February 28, 1948. The exercises were held at 4 P.M. in the Reception Room of Jones Hall. Dr. Melville H. Hatch (Beta), former National Vice-Chancellor and Professor of Zoology and Acting Executive Office of the Department of Zoology at the University of Washington, was the installing officer. He was assisted by Professor James R. Slater (Psi), Professor of Biology at the College of Puget Sound, Sponsor for the new chapter and Acting Vice-President; by Dr. Gordon D. Alcorn (Psi), Associate Professor of Biology at the College of Puget Sound, Acting Secretary; and Miss Gertrude Minsk (Psi), Acting Treasurer.

The following persons were initiated as charter members of Alpha Phi Chapter at the time of installation.

Faculty members: Professor James R. Slater, Dr. Gordon D. Alcorn.

Active members: Robert Henry Alexander, Jerry Lynn Baker, Audrey M. Boucher, Howard Randolph Bowman, Glenn Howard Brokaw, Rodney Allison Brown, Edwin Ford Dicks, Lois Arlene Fassett, Paul Ivan Gingrich, Jr., Norman Gilbert Hawkins, Murray Leathers Johnson, Frank Phillips Jones, Edward Alexander Kitchin, James Stewart Legg, Merle Alan Legg, Herman Mattson Myhrman, Thelma June Smith, Obert Julian Sovde, Robert Dean Sprenger.

Following the initiation of charter members, Chapter Officers were elected and installed: James Stewart Legg, President; Rodney Allison Brown, Vice-President; Thelma June Smith, Secretary; Murray Leathers Johnson, Treasurer.

The installing officer then declared the new chapter installed and read messages of greeting and congratulation from Dr. Richard B. Goldschmidt, Honorary President; from Dr. A. I. Ortenberger, National Secretary; from Mr. Erwine Hall Stewart, National Treasurer; and from the following chapters: Eta, Kappa, Nu, Pi, Phi, Alpha Beta, Alpha Kappa, Alpha Iota, Alpha Lambda, Alpha Mu, Alpha Tau, Alpha Rho, and Alpha Upsilon. Mr. Robert Stapp, President of Psi Chapter, was present and personally conveyed the greetings of his chapter.

Thereupon President James Legg took the chair and adjourned the meeting.

An Installation Banquet was held at 6:15 P.M. in the Student Union. Professor Slater, as toastmaster, called upon Dr. Hatch for a few words on "Phi Sigma—Aims and Ideals." Dean John B. Regester of the College of Puget Sound responded for the College and Dr. Alcorn told something of the steps leading to the formation of the Chapter. Dr. Hatch then gave an address on "The Deduction of Evolution from the General Properties of Living Matter," which was followed by a short informal discussion.

ALPHA UPSILON

—University of California

President—Yost Amrein, Zoology Department, 405 Hilgard, Los Angeles 24, California.

Vice-President—Margaret Brown, Zoology Dept., 405 Hilgard, Los Angeles 24, California.

Recording Secretary—Alice Rudolph, Zoology Dept., 405 Hilgard, Los Angeles 24, California.

Treasurer—Armstrong Dowell, Zoology Dept., 405 Hilgard, Los Angeles 24, California.

Alpha Upsilon biological honorary at the University of California, Los Angeles campus, was installed as the Alpha Upsilon chapter of Phi Sigma, biological recognition society, in ceremonies held Saturday, May 17, 1947.

Dr. A. I. Ortenburger of the University of Oklahoma, eminent herpetologist and secretary of the Phi Sigma Council, arrived by plane from Norman, Oklahoma, to act as installing officer. Dr. Tema Schults Clare of Alpha Alpha chapter assisted. Sixty-six charter members were installed. The officers installed include Vera Sutter, president; Margaret Brown, vice-president; Hisako Nishihara, treasurer; Alice Rudolph, recording secretary; and Lee Franke Browne, corresponding secretary.

Guests and faculty members at the installation ceremonies were Mrs. Tema Schultz Clare, Frances L. Cramer, Catherine Beers, Winnefred King, Edith Purer, and James Akin from the Alpha Alpha chapter; Dr. Edgar Lazier, Dr. Meridian R. Ball, and Dr. Sarah R. Atsatt from the Mu chapter; Forest Talkington from the Alpha Eta chapter; Mr. P. A. Miller from the Psi chapter; Dr. Orda A. Plunkett, Dr. F. Murray Scott, and Dr. Ruth S. Lynch.

Left to Right: Alice Rudolph, recording secretary; Hisako Nishihara, treasurer; Margaret Brown, vice-president; Lee Franke Browne, corresponding secretary; Vera Sutter, president.

JOHN MASEFIELD ON "THE UNIVERSITY"

There are few earthly honours more to be prized than this which you are now giving to us. There are few earthly things more splendid than a University. In these days of broken frontiers and collapsing values, when the dams are down and the floods are making misery, when every future looks somewhat grim and every ancient foothold has become something of a quagmire, wherever a University stands, it stands and shines; wherever it exists, the free minds of men, urged on to full and fair enquiry, may still bring wisdom into human affairs.

There are few earthly things more beautiful than a University. It is a place where those who hate ignorance may strive to know, where those who perceive truth may strive to make others see; where seekers and learners alike, banded together in the search for knowledge, will honour thought in all its finer ways, will welcome thinkers in distress or in exile, will uphold ever the dignity of thought and learning and will exact standards in these things. They give to the young in their impressionable years the bond of a lofty purpose shared, of a great corporate life whose links will not be loosed until they die. They give young people that close companionship for which youth longs, and that chance of the endless discussion of the themes which are endless, without which youth would seem a waste of time.—John Masefield, in an address at Sheffield University. Reprinted from the *Harvard Alumni Bulletin.*

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REVOLUTIONARY CHANGE IN HIGHER EDUCATION

I have the feeling that American higher education is undergoing a revolutionary change. The college graduate of 1958 will have an entirely different college experience from that of the graduate of today.

There is a need for "general education." What is "general education"? Briefly it is that type of education that should prepare young people for the common life of their time and their kind. It is not the esoteric knowledge of the scholar nor is it concerned with highly specialized professional education.

"General education" should be interested in teaching not the facts but fundamentals. There are too many facts to be learned. We should deal intensively with a few principles from various fields of knowledge.

What we need is a liberal education for contemporary life. We need to teach how to live. Actually we need to return to liberal education in the United States.

There will be no cheapening of the bachelor degree. On the contrary "general education" is the re-establishment of liberal education.

It is the professional people—the doctors, lawyers, engineers, businessmen—who are giving the greatest impetus to general education. They want in their employees a liberal base for professional work. They want an understanding of economics and social sciences. But they also want to leave specialization for on-the-job training.—*Dean Earl J. McGrath (State U. of Iowa) in Founder's Day Address, University of Akron.*

▽

The Duties Of The Chapter Secretary

To the National Secretary:

1. At the beginning of each school year furnish the names *and* addresses of chapter officers.
2. Order all chapter supplies well in advance of time needed.
3. Order certificates at least two weeks before initiation date.
4. Send initiation fees and membership record blanks at time certificates are ordered.
5. Be sure that copies of THE BIOLOGIST are received by *all* members including faculty and honorary members.

To the National Treasurer:

1. Furnish correct list of chapter officers and addresses.
2. Inform the national treasurer at least a month in advance of the correct number of BIOLOGISTS needed for all your members.
3. Report name, serial number and date of initiation of each initiate at time certificates are ordered.

To the Editor:

1. Furnish a correct list of chapter officers and addresses.
2. Send in short research papers of interest in any or all biological fields.
3. Send chapter news letters for BIOLOGIST at least four weeks in advance of publication.
4. Send in copies of outstanding short biological lectures or addresses delivered at your institution.
5. Send in helpful suggestions or constructive criticisms concerning THE BIOLOGIST.

Initiation Insignia

Does your Chapter carry out the Ritual of Initiation properly? In other words, has your Chapter the model Phi Sigma Key and the large Phi Sigma Coat of Arms required by the Ritual? They are both in easy reach of every Chapter's finances.

The Model Key, furnished in two colored gold, $4.50.

The Coat of Arms, hand-colored on 12x16 heavy paper, $3.50.

Address all orders, and make all checks payable to the Secretary, Dr. A. I. Ortenburger, Department of Zoology, University of Oklahoma, Norman, Oklahoma.

Phi Sigma Jewelry

Membership keys may be obtained from the National Treasurer through Chapter Treasurers, or directly. In the latter case give your name, Chapter and year of initiation, *plainly*.

REVISED PRICES OF KEYS

Standard Size (official) 10K gold	
Swivel ring top	$5.50
Stationary ring top	5.00
Swivel ring top; mounted as pin; safety clasp	6.75
Stationary ring top; mounted as pin; safety clasp	6.25
Small Size 10K gold	
Swivel ring top	5.00
Stationary ring top	4.50
Stationary ring top; mounted as pin; safety clasp	5.50
Green gold keys, additional	2.00
White gold keys, additional	5.00

To the foregoing prices 20% must be added to cover Federal defense tax.

Address jewelry orders to:
Mr. Erwine Hall Stewart,
Treasurer of Phi Sigma,
Mesa, Colorado.

PHI SIGMA

BIOLOGICAL HONOR SOCIETY

"The object of Phi Sigma is to promote interest in biological research. Although originally designated as an honorary biological research society, it should not be considered as a working guild of biologists interested in research. In effect, election to Phi Sigma should be an opportunity for better work, rather than merely election to an honorary society."

Mile Posts:

1915	March 17, Alpha Chapter organized, Ohio State University, Columbus.
1916	May, Central Governing Body organized, BIOLOGIST first issued.
1917	June, last War-time BIOLOGIST issued.
1921	February, BIOLOGIST revived.
1924	December, First National Meeting, Constitution revised, Washington, D.C.
1925	December, Second National Meeting, First Science Program, Kansas City.
1926	December, Third National Meeting, Second Science Program, Philadelphia.
1927	December, Third Science Program, Nashville.
1928	December, Fourth National Meeting, Coat-of-Arms adopted, Fourth Science Program, New York.
1930	January, Council Meeting, Ritual Revised, Norman, Okla.
	December, Fifth National Meeting, Fifth Science Program, Cleveland.
1931	Phi Sigma Letters Registered, U. S. Patent Office.
1932	December, Sixth Science Program, Atlantic City.
1933	June, Sixth National Meeting, Seventh Science Program, Chicago.
1935	December, Seventh National Meeting, Eighth Science Program, St. Louis.
1937	December, Eighth National Meeting, Ninth Science Program, Indianapolis.
1939	December, Ninth National Meeting, Tenth Science Program, Silver Anniversary, Ohio State University, Columbus.
1941	December, Tenth National Meeting, Dallas, Texas.
1947	December, Eleventh National Meeting, Boston, Mass.

Expansion:

The Constitution provides that: "An active chapter may be established in any institution of learning which requires for graduation the equivalent of four years of collegiate work, and which is equipped with facilities for research work. - - - - Any petitioning group must be active for at least one year before it may be granted a charter."